

Radio test report — Radiated Emissions RRUS 32A B2

305068-1TRFWL-R1

Date of issue: April 20, 2016

Applicant:

Ericsson Canada

Product:

RRUS 32A / AIR 32 Band 2 Transceiver

Model:

RRUS 32A B2

Part number:

KRC 161 418/1

FCC ID:


TA8AKRC161418-1

IC Registration number:

287AB-AS1614181

Specifications/Summary:

Standard	Environmental Phenomenon	Compliance
FCC 47 CFR Part 24 – Personal communications services	Part §24.238(a) Out of band emissions (Radiated)	Yes
RSS-133 – 2 GHz Personal Communications Services	Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)	Yes

Tested by	David Duchesne, Senior EMC/Wireless Specialist
Reviewed by	Kevin Rose, Wireless/EMC Specialist
Review date	April 20, 2016
Reviewer signature	

Test location

Company name	Nemko Canada Inc.
Address	303 River Road
City	Ottawa
Province	Ontario
Postal code	K1V 1H2
Country	Canada
Telephone	+1 613 737 9680
Facsimile	+1 613 737 9691
Toll free	+1 800 563 6336
Website	www.nemko.com
Site number	FCC test site registration number: 176392, IC: 2040A-4 (3 m semi anechoic chamber)

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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Section 1. Report summary

1.1 Applicant and manufacturer

Company name	Ericsson Canada Inc.
Address	349 Terry Fox Drive, Ottawa, ON, Canada, K2K 2V6

1.2 Test specifications

FCC 47 CFR Part 24	Personal communications services (Subpart E – Broadband PCS)
FCC 47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; general rules and regulations
RSS-133 (Issue 6)	2 GHz Personal Communications Services
RSS-GEN (Issue 4)	General Requirements for Compliance of Radio Apparatus

1.3 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard except as noted in section 1.4 below. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See “Summary of test results” for full details.

1.4 Exclusions

As per client request the EUT was only assessed for FCC Clause §24.238(a) “out of band emission” and RSS Clause 6.5.1 (ii) “Transmitter Unwanted Emissions”. All other sections of FCC Part 24 and RSS-133 were omitted.

1.5 Test report revision history

Table 1.5-1: Test report revision history

Revision #	Details of changes made to test report
TRF	Original report issued

Notes: None

Section 2. Summary of test results

2.1 FCC Part 24 Subpart E test results

Table 2.1-1: FCC Part 24 – Radio Results

Part	Test description	Verdict
§24.238(a)	Out of band emissions (Radiated)	Pass

Notes: None

2.2 RSS-133 test results

Table 2.2-1: RSS-133 – Radio Results

Clause	Test description	Verdict
6.5.1 (ii)	Transmitter Unwanted Emissions (Radiated)	Pass

Notes: None

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	March 4, 2016
Nemko sample ID number	133-001700 (Project NEX-305068)

3.2 EUT information

Product name	RRUS 32A / AIR 32 Band 2 Transceiver
Model	RRUS 32A B2
Part number	KRC 161 418/1
Revision	R1C
Serial Number	D16R536331
Antenna Ports	4 TX/RX Ports
IBW	LTE/WCDMA: 40 MHz, GSM: 20 MHz
FDD	80MHz
Frequency	TX (DL): 1930 – 1990 MHz, RX (UL): 1850 – 1910 MHz
Nominal O/P per Antenna Port	Single Carrier: 1 x 30W (44.77 dBm) Multi-Carrier: 2 x 15W (41.76 dBm) Multi-Carrier: 3 x 10W (40 dBm) Multi-Carrier: 4 x 7.5W (38.75 dBm)
Accuracy (Nominal):	+/- 0.1 PPM
Nominal Voltage:	-48 V _{DC} @ 20A
RAT:	LTE: SC, MC WCDMA: SC, MC GSM: MC Multi RAT (W + L), (G + L), (G + W): MC
Modulation:	LTE: QPSK, 16QAM, 64 QAM WCDMA: QPSK, 16QAM, 64 QAM GSM: GMSK, 8-PSK, 16 AQM, APSK
Channel Bandwidth:	LTE: 1.4, 3, 5, 10, 15, 20 MHz WCDMA: 4.2 to 5 MHz
Maximum Combined OBW per Port:	40 MHz
Digital Interface	CPRI: 2.5 Gbps / 5 Gbps / 10 Gbps (Data 1, Data 2)
Channel Raster:	100 kHz for LTE, 200 kHz for WCDMA, and GSM
Multi-carrier:	Single Antenna, Tx Diversity, MIMO closed loop (4x2 MIMO and 4-way receiver diversity for LTE)
Operating Temperature:	-40 to 55°C
Total Power based on IBW:	4 x 30W
Supported Carrier Configurations:	LTE BW=1.4, 3, 5, 10 MHz (1-3), 15, 20 MHz (1-2), WCDMA= (1-2), GSM = MC only (1-2)
MSR Maximum Carrier Configurations	40 MHz

3.2 EUT information, continued

Description/theory of operation

The RRUS 32A B2 is a multi-standard Antenna Radio Unit (ARUS) forming part of Ericsson's Radio Base Station (RBS) equipment. The ARUS product provides the radio access for mobile and fixed devices and is intended for the outdoor environment. The RRUS 32A B2 is designed to be co-located and directly mated with a compatible antenna, specified for transceiver path optimization. A fiber optic interface provides the ARUS / RBS control and digital communications between the Radio and RBS. The location of the ARUS with respect to the RBS is only limited to a distance dictated by the limitations of the fiber link. The RRUS 32A B2 supports four (4) Transmit / Receive ports operating in the E-UTRA Band 2 (AWS) at a Downlink (transmit) frequency from 1930 MHz to 1990 MHz and an Uplink (receive) frequency from 1850 MHz to 1910 MHz. The radio operates in FDD (Frequency Division Duplex) with a duplex spacing of 80 MHz and supports operation on multi Radio Access Transmission Standards (RATS) at transmit bandwidths up to 40 MHz. The RRUS 32A B2 radio operates over the 4 transmit ports in Single, Multi-Carrier, Mixed Mode, and MIMO transmission with a maximum rated RF output power of 30W per port over an operational temperature of -40 to 55° C. The ARUS is mounted directly behind a specified antenna along with a Fan Tray and Solar Shield cover, which provides Forced Air Cooling and ducting for directional air flow and thermal optimization. The Fan Tray has an internal controller which will vary the fan speed based on temperature and cooling requirements monitored by sensors in the ARUS and Fan Tray. Power for the Fan Tray is provided from the ARUS (30V @ < 2 A). The ARUS product also has an active RET (Remote Electronic Tilt) function provided for antenna directional optimization. Power for this option is provided via the ARUS RET interface (30V @ < 2A).

Operational frequencies

Clocks / Oscillators	
61.44 MHz	ADC, Surveyor
122.88 MHz	DAC, TOR
245.76 MHz	DAC DATA
983.04 MHz	ADC
614.4 (Mb/s)	CPRI E.6
2457.6 (Mb/s)	CPRI E.24
4915.2 (Mb/s)	CIPRI E.48
9.8304 (Gb/s)	CIPRI E.96
439.04 MHz	RXIFLO1
2090.4 MHz	RXIFLO2

Port description

Port	Description
DC Power	-48VDC, 3 Wire
Ground	Main Unit Ground
Data 1	CPRI Fiber
Data 2	CPRI Fiber
MMI	Radio Status Display
RF A/B/C/D	TX/RX Test Port to ARUS branch A-D

Physical

Dimensions	1505 x 334 x 272mm [H x W x D] approximate
Weight	49kg
Cooling	Forced Air
Mounting	Vertical, Pole, Wall, Building...

Software details

CXP9017316%5_R60KM

3.3 EUT exercise and monitoring details

Test Frequencies :

Band 2 (IBW = 40 MHz LTE/WCDMA, 20 MHz GSM)

TX (DL): 1930–1990 MHz

RX (UL): 1850–1910 MHz

Duplex Spacing: 80 MHz

Test frequencies:

B2 LTE Single Carrier												
Bandwidth MHz	Transmit/DL (MHz)						Receive/UL (MHz)					
	B		M		T		B		M		T	
	EARFCN	Freq.	EARFCN	Freq.	EARFCN	Freq.	EARFCN	Freq.	EARFCN	Freq.	EARFCN	Freq.
1.4	607	1930.7	900	1960	1193	1989.3	18607	1850.7	18900	1880.0	19193	1909.3
3	615	1931.5	900	1960	1185	1988.5	18615	1851.5	18900	1880.0	19185	1908.5
5	625	1932.5	900	1960	1175	1987.5	18625	1852.5	18900	1880.0	19175	1907.5
10	650	1935.0	900	1960	1150	1985.0	18650	1855.0	18900	1880.0	19150	1905.0
15	675	1937.5	900	1960	1125	1982.5	18675	1857.5	18900	1880.0	19125	1902.5
20	700	1940.0	900	1960	1100	1980.0	18700	1860.0	18900	1880.0	19100	1900.0

B2 LTE Multi-Carrier (Spurious Emissions)																		
Band.	Transmit/DL (MHz)																	
MHz	EARFCN	B1	EARFCN	B2	EARFCN	B3	EARFCN	M1	EARFCN	M2	EARFCN	M3	EARFCN	T1	EARFCN	T2	EARFCN	T3
1.4	607	1930.7	979	1967.9	993	1969.3	707	1940.7	1079	1977.9	1093	1979.3	807	1950.7	1179	1987.9	1193	1989.3
3	615	1931.5	955	1965.5	985	1968.5	715	1941.5	1055	1975.5	1085	1978.5	815	1951.5	1155	1985.5	1185	1988.5
5	625	1932.5	925	1962.5	975	1967.5	725	1942.5	1025	1972.5	1075	1977.5	825	1952.5	1125	1982.5	1175	1987.5
10	650	1935.0	850	1955.0	950	1965.0	750	1945.0	950	1965.0	1050	1975.0	850	1955.0	1050	1975.0	1150	1985.0
15	675	1937.5	-	-	925	1962.5	775	1947.5	875	1957.5	1025	1972.5	875	1957.5	-	-	1125	1982.5
20	700	1940.0	-	-	900	1960.0	800	1950.0	800	1950.0	1000	1970.0	900	1960.0	-	-	1100	1980.0

B2 WCDMA Single Carrier														
Bandwidth (MHz)	Transmit / DL (MHz)						Receive / UL (MHz)							
	B		M		T		B		M			T		
	ARFCN	Freq.	ARFCN	Freq.	ARFCN	Freq.	ARFCN	Freq.	ARFCN	Freq.	ARFCN	Freq.	ARFCN	Freq.
5	9662	1932.4	9800	1960	9938	1987.6	9262	1852.4	9400	1880.0	9538	1907.6		

B2 WCDMA Multi-Carrier (Spurious emissions)						
Bandwidth (MHz)	Transmit / DL (MHz)					
	B1	B2	M1	M2	T1	T2
5	1932.4	1937.4	1942.4	1977.6	1982.6	1987.6
ARFCN	9662	9687	9712	9888	9913	9938

B2 GSM Single Carrier												
Bandwidth (MHz)	Transmit / DL (MHz)						Receive / UL (MHz)					
	B		M		T		B		M		T	
	ARFCN	Freq.	ARFCN	Freq.	ARFCN	Freq.	ARFCN	Freq.	ARFCN	Freq.	ARFCN	Freq.
0.2	513	1930.4	661	1960	809	1989.6	513	1850.4	661	1880.0	809	1909.6

B2 GSM Multi-Carrier (Spurious emissions, 1-2G+L and 1-2G+W configurations)						
Bandwidth (MHz)	Transmit / DL (MHz)					
	B1	B2	M1	M2	T1	T2
0.2	1930.4	1930.6	1940.2	1940.4	1950.2	1950.4
ARFCN	513	514	562	563	612	613

3.4 EUT setup details

Table 3.4-1: EUT sub assemblies

Description	Model	Part number	Serial number	Rev.
Fan Tray	Fan Unit	BKV 106 168/2	X63R000251	R1A

Table 3.4-2: EUT interface ports

Description	Qty.
Power	1
Data1	1
Data2	1
MMI	1

Table 3.4-3: Inter-connection cables

Cable description	From	To	Length (m)
CPRI fiber cable	METS-LITE	EUT Data-1	20
Ground	Lab Ground	EUT Ground	2
CPRI fiber cable	METS-LITE	EUT Data-1	20

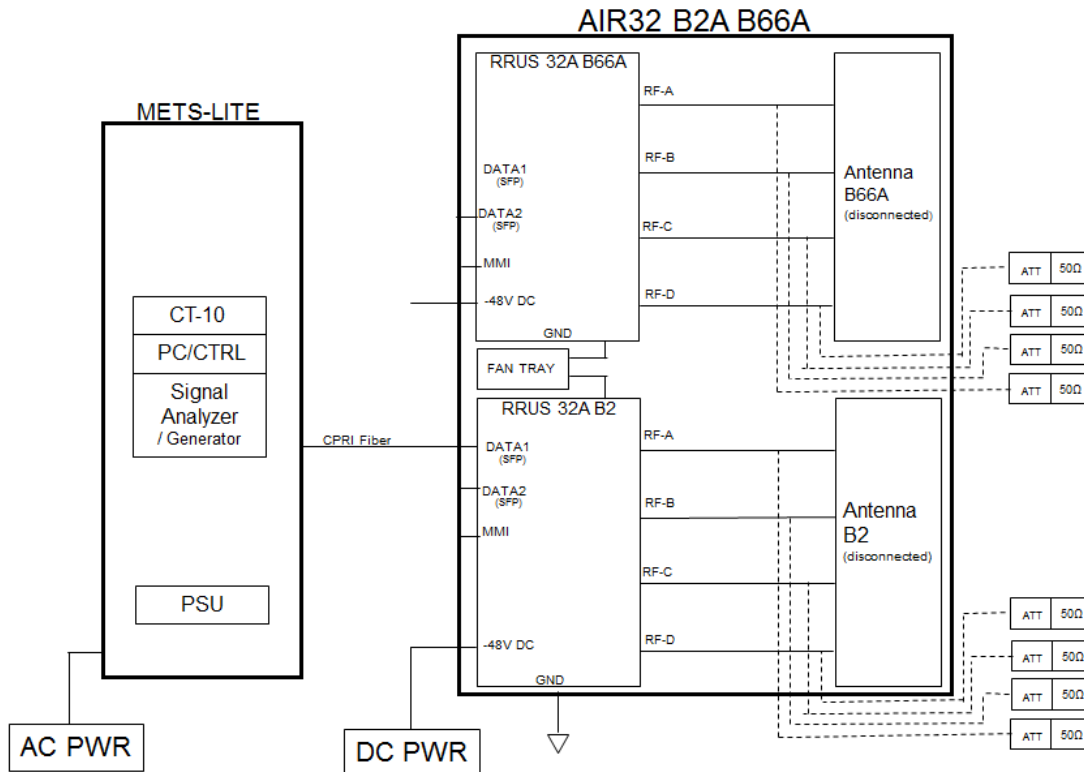


Figure 3.4-1: Setup diagram – RRUS 32A B2 with Fan Tray

3.5 Support equipment, details

Support equipment

METS Lite Test System

- Anritsu MS 2691 VSA/Sig Gen
- HP Laptop
- CT10 LTE, WCDMA, and GSM Test and Verification Platform

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.2 Technical judgment

None

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

Temperature	15–30 °C
Relative humidity	20–75 %
Air pressure	860–1060 mbar

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages $\pm 5\%$, for which the equipment was designed.

Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of $K = 2$ with 95% certainty.

Test name	Measurement uncertainty, dB
Radiated spurious emissions	3.78

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: Equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber	TDK	SAC-3	FA002047	1 year	Dec. 01/16
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 26	FA002043	1 year	Jan. 07/17
Bilog antenna (20–3000 MHz)	Sunol	JB3	FA002108	1 year	Apr. 12/16
Spectrum analyzer	Rohde & Schwarz	FSU	FA001877	1 year	Mar. 27/16
Horn antenna (1–18 GHz)	EMCO	3115	FA000825	1 year	Apr. 01/16
Horn antenna (18–40 GHz)	EMCO	3116	FA002487	2 year	July 9/16
Pre-amplifier (1–18 GHz)	JCA	JCA118-503	FA002091	1 year	May 05/16
Pre-amplifier (18–26 GHz)	Narda	BBS-1826N612	FA001550	—	VOU
Pre-amplifier (26–40 GHz)	Narda	DBL-2640N610	FA001556	—	VOU

Notes: VOU - verify on use

Table 7.1-2: Test software details

Test description	Manufacturer of Software	Details
Radiated emissions	Rhode & Schwarz	EMC32, Software for EMC Measurements, Version 8.53.0

Notes: None



Section 8. Testing data

8.1 FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

8.1.1 Definitions and limits

PART 24—PERSONAL COMMUNICATIONS SERVICES

Subpart E—Broadband PCS

§24.238 Emission limitations for Broadband PCS equipment.

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

RSS-133 — 2 GHz Personal Communications Services

6.5 Transmitter Unwanted Emissions

ii. After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10}(P)$ (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

8.1.2 Test summary

Verdict	Pass				
Test date	March 14, 2016	Test engineer	David Duchesne		
Temperature	22.2 °C	Relative humidity	42	Air pressure	974.3 mbar

8.1.3 Observations, settings and special notes

- The following test cases were verified as per client test plan see Table 8.1–1 below
- The spectral plots are a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

Table 8.1-1: Test cases

Test Case	Description
1G + 1L	1 GSM Middle Channel Carrier and 1 LTE Middle Channel Carrier
1G + 1W	1 GSM Middle Channel Carrier and 1 WCDMA Middle Channel Carrier
1W + 1L	1 WCDMA Middle Channel Carrier and 1 LTE Middle Channel Carrier
GSM_1Carrier_M_GSMK	1 GSM Middle Channel Carrier, GSMK Modulation
LTE_1Carrier_B_14M_QPSK	1 LTE Bottom Channel Carrier, 1.4 MHz Bandwidth, QPSK Modulation
LTE_1Carrier_M_14M_QPSK	1 LTE Middle Channel Carrier, 1.4 MHz Bandwidth, QPSK Modulation
LTE_1Carrier_T_14M_QPSK	1 LTE Top Channel Carrier, 1.4 MHz Bandwidth, QPSK Modulation
LTE_2Carrier_M_14M_QPSK	2 LTE Middle Channel Carriers, 1.4 MHz Bandwidth, QPSK Modulation
WCDMA_1Carrier_M_16QAM	1 WCDMA Middle Channel Carrier, 16QAM Modulation

Notes:

Section 8 *Testing data*
Test name *FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)*
Specification *FCC Part 24E and RSS-133*



8.1.3 Observations, settings and special notes, continued

Spectrum analyzer settings

Frequency range	30 MHz to 10 th harmonic
Detector mode	Peak
Resolution bandwidth	100 kHz (below 1 GHz), 1000 kHz (above 1 GHz)
Video bandwidth	>RBW
Trace mode	Max Hold

Section 8

Testing data

Test name

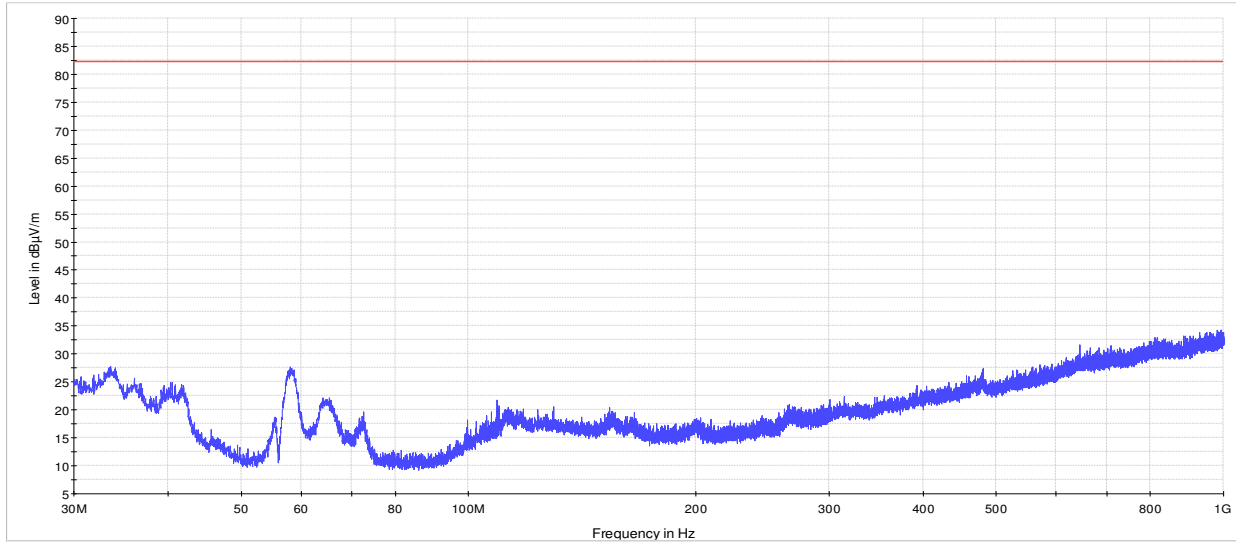
FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

Specification

FCC Part 24E and RSS-133

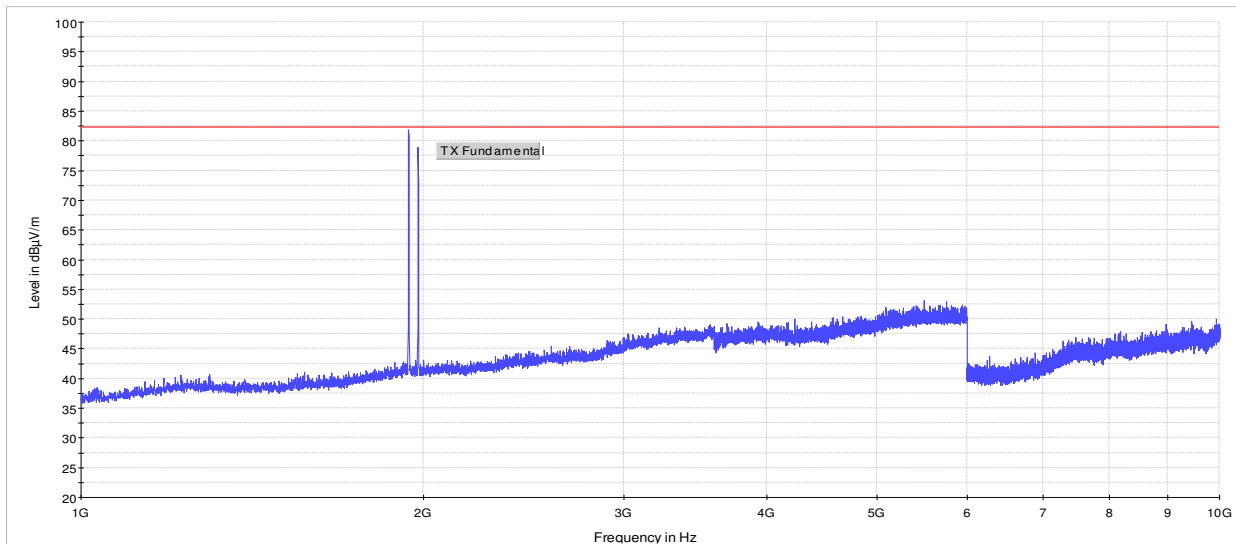


8.1.4 Test data



Vertical and Horizontal (1G+1L)
— Preview Peak Detector
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-1: 30 to 1000 MHz – 1G + 1L



Vertical and Horizontal (1G+1L)
— Preview Peak Detector
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-2: 1 to 10 GHz – 1G + 1L

Section 8

Testing data

Test name

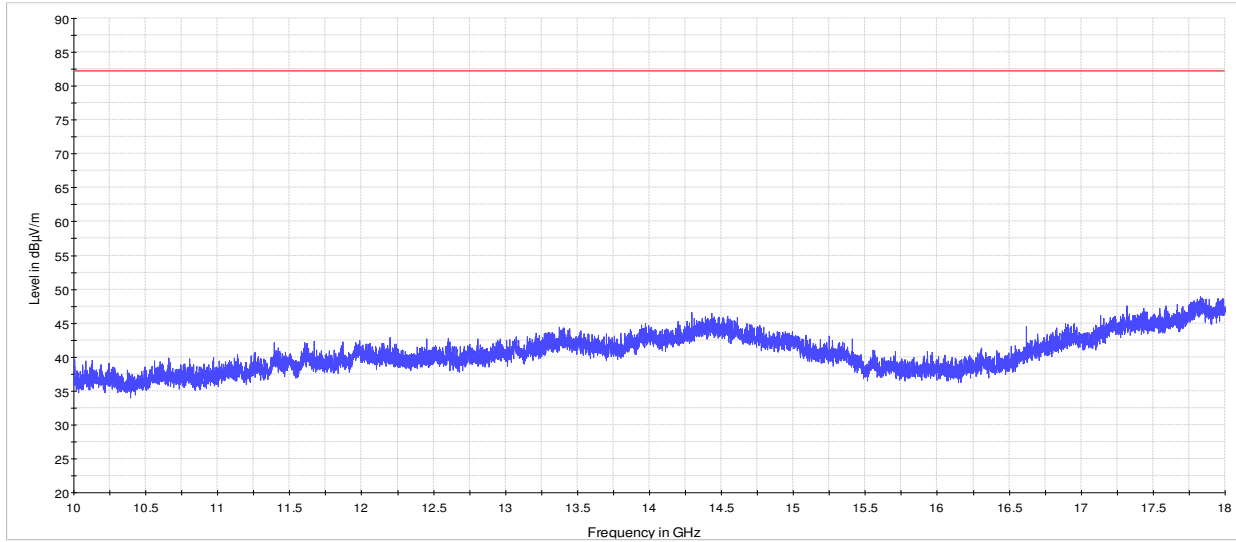
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Specification

FCC Part 24E and RSS-133

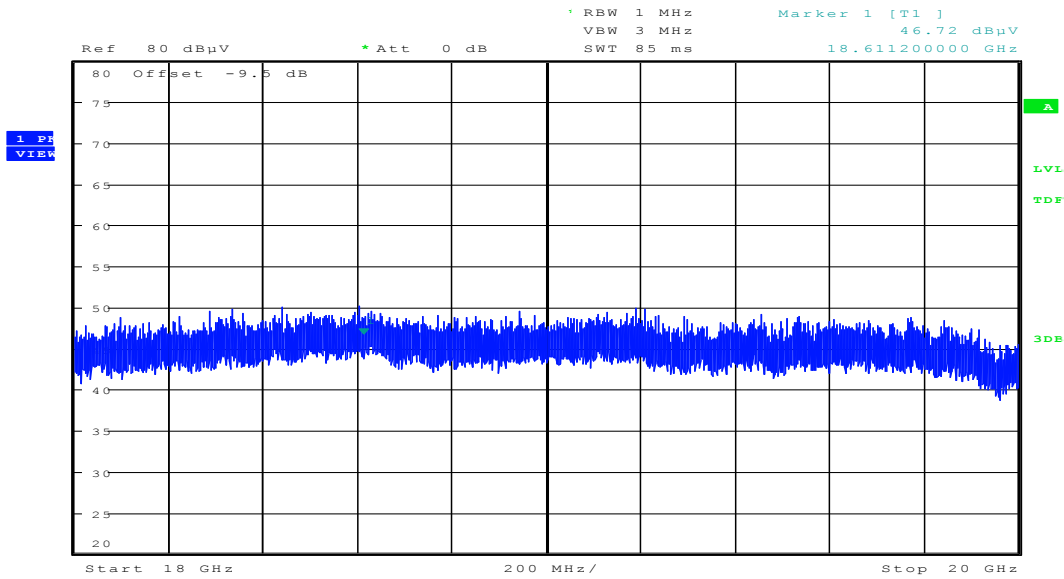


8.1.4 Test data, continued



Vertical and Horizontal (1G+1L)
 Preview Peak Detector
 Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-3: 10 to 18 GHz – 1G + 1L



Note: (Limit = 82.23 dBuV= -13 dBm)

Figure 8.1-4: 18 to 20 GHz – 1G + 1L

Section 8

Testing data

Test name

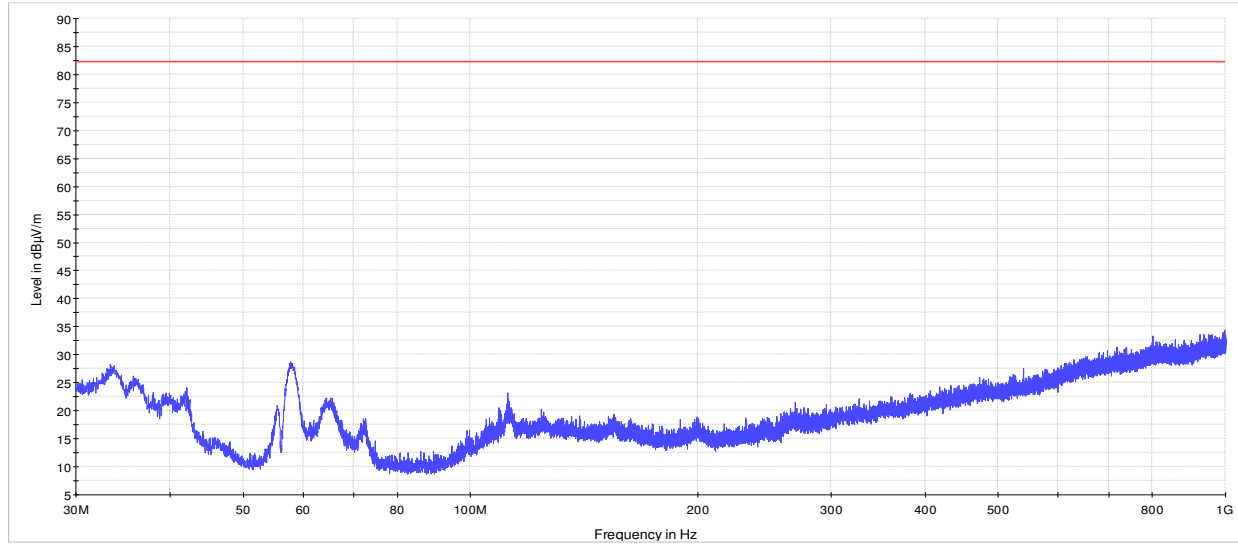
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Specification

FCC Part 24E and RSS-133

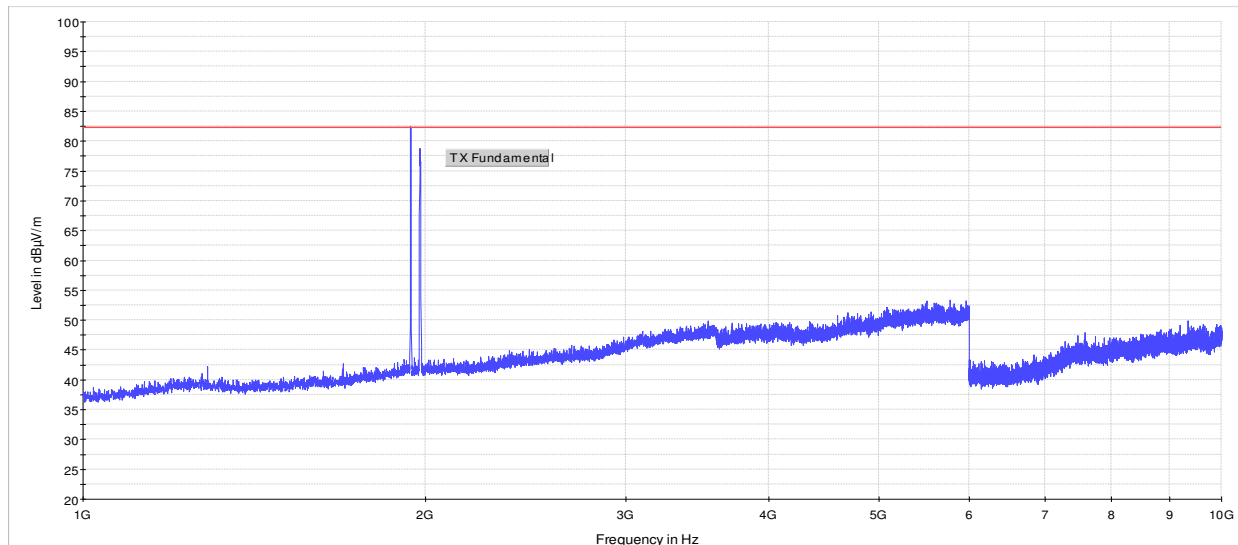


8.1.4 Test data, continued



Vertical and Horizontal (1G+1W)
Preview Peak Detector
Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-5: 30 to 1000 MHz – 1G + 1W



Vertical and Horizontal (1G+1W)
Preview Peak Detector
Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-6: 1 to 10 GHz – 1G + 1W

Section 8

Testing data

Test name

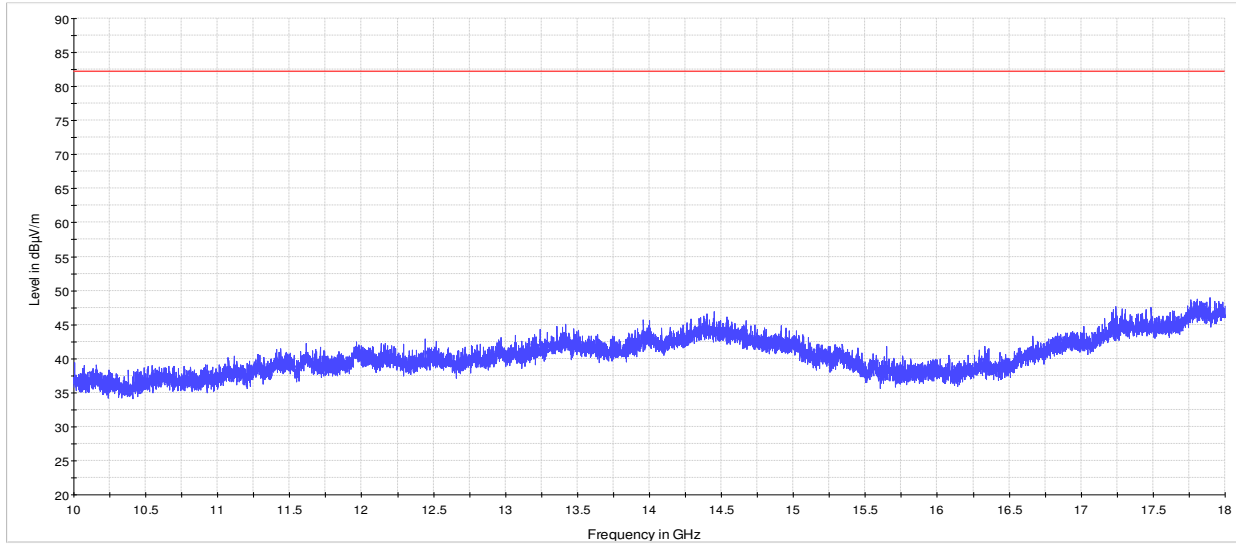
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Specification

FCC Part 24E and RSS-133

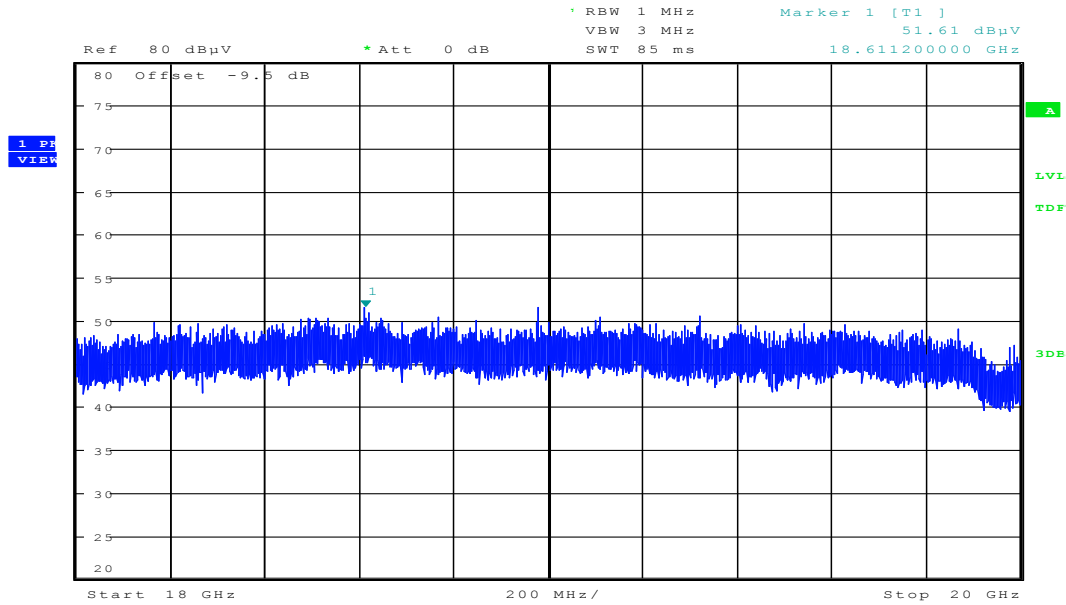


8.1.4 Test data, continued



Vertical and Horizontal (1G+1W)
 Preview Peak Detector
 Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-7: 10 to 18 GHz – 1G + 1W



Note: (Limit = 82.23 dBuV= -13 dBm)

Figure 8.1-8: 18 to 20 GHz – 1G + 1W

Section 8

Testing data

Test name

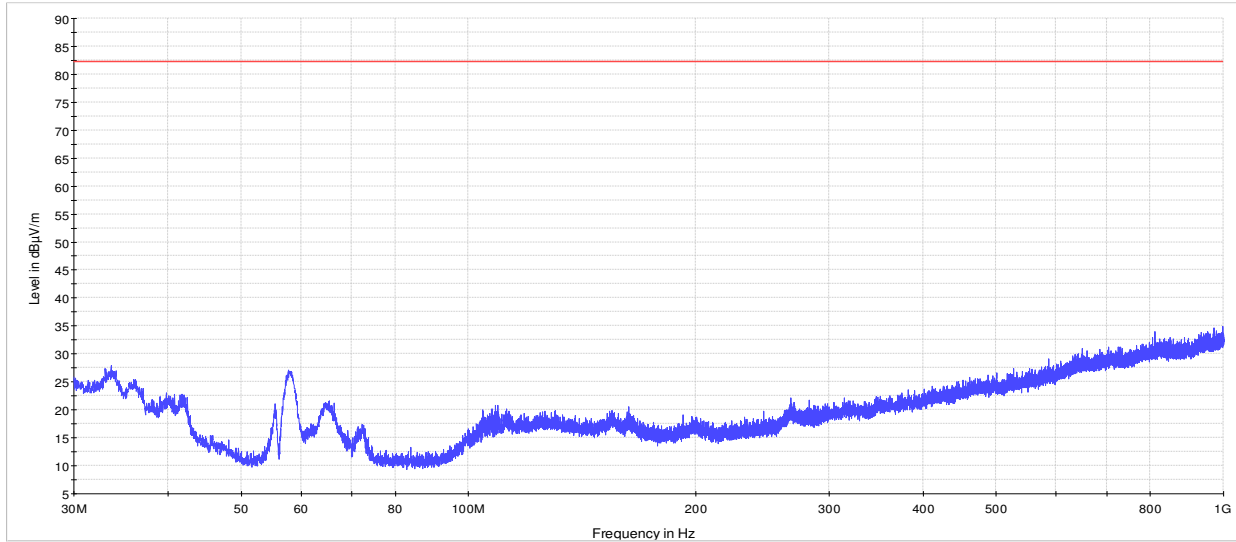
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Specification

FCC Part 24E and RSS-133

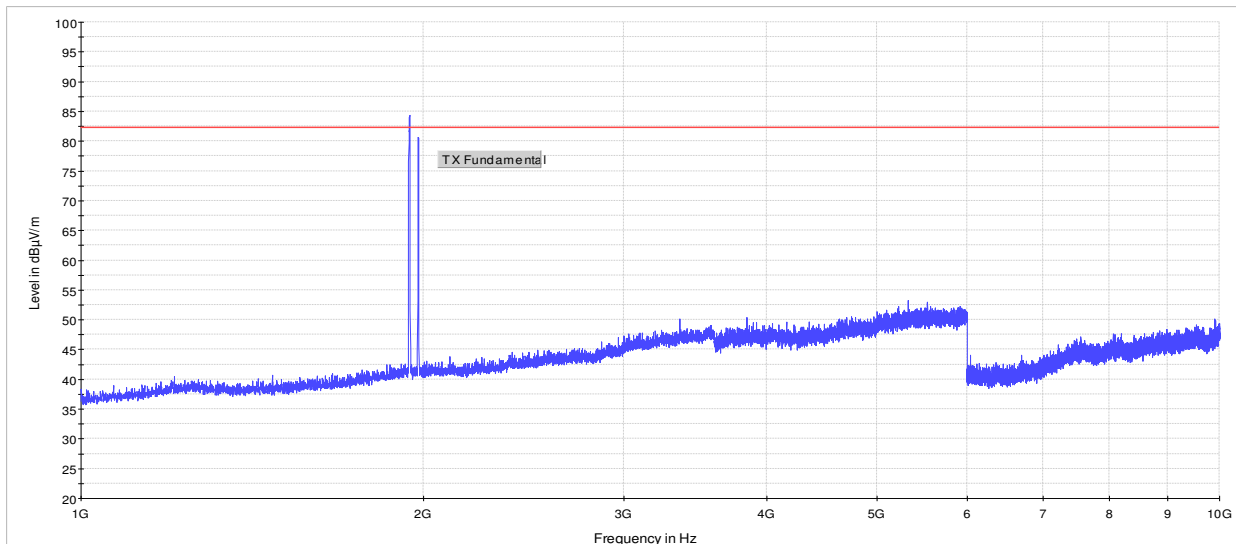


8.1.4 Test data, continued



Vertical and Horizontal (1W+1L)
— Preview Peak Detector
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-9: 30 to 1000 MHz – 1W + 1L



Vertical and Horizontal (1W+1L)
— Preview Peak Detector
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-10: 1 to 10 GHz – 1W + 1L

Section 8

Testing data

Test name

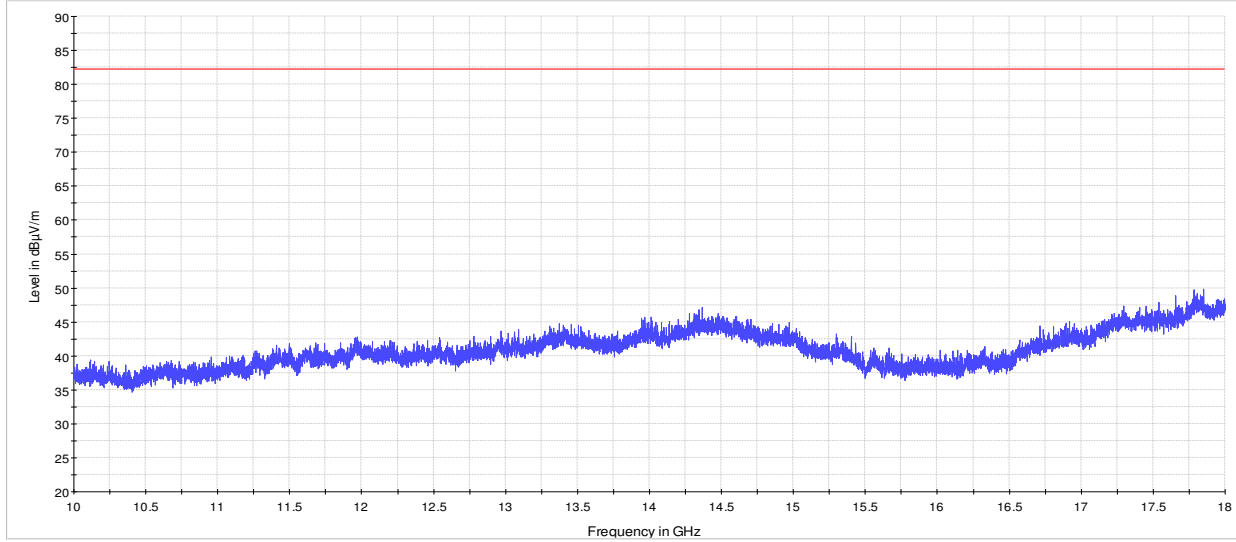
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Specification

FCC Part 24E and RSS-133

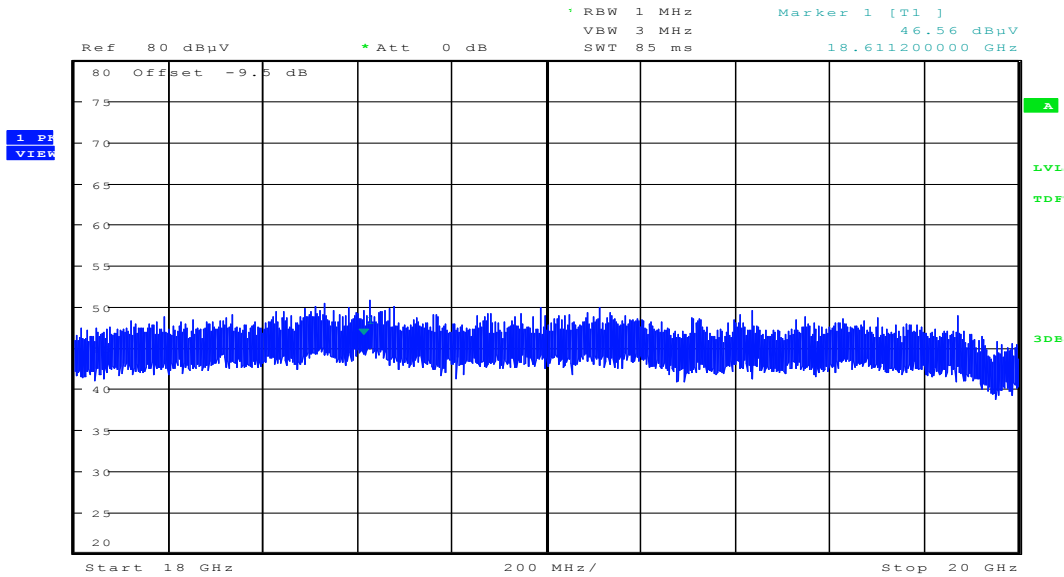


8.1.4 Test data, continued



Vertical and Horizontal (1W+1L)
 Preview Peak Detector
 Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-11: 10 to 18 GHz – 1W + 1L



Note: (Limit = 82.23 dBuV= -13 dBm)

Figure 8.1-12: 18 to 20 GHz – 1W + 1L

Section 8

Testing data

Test name

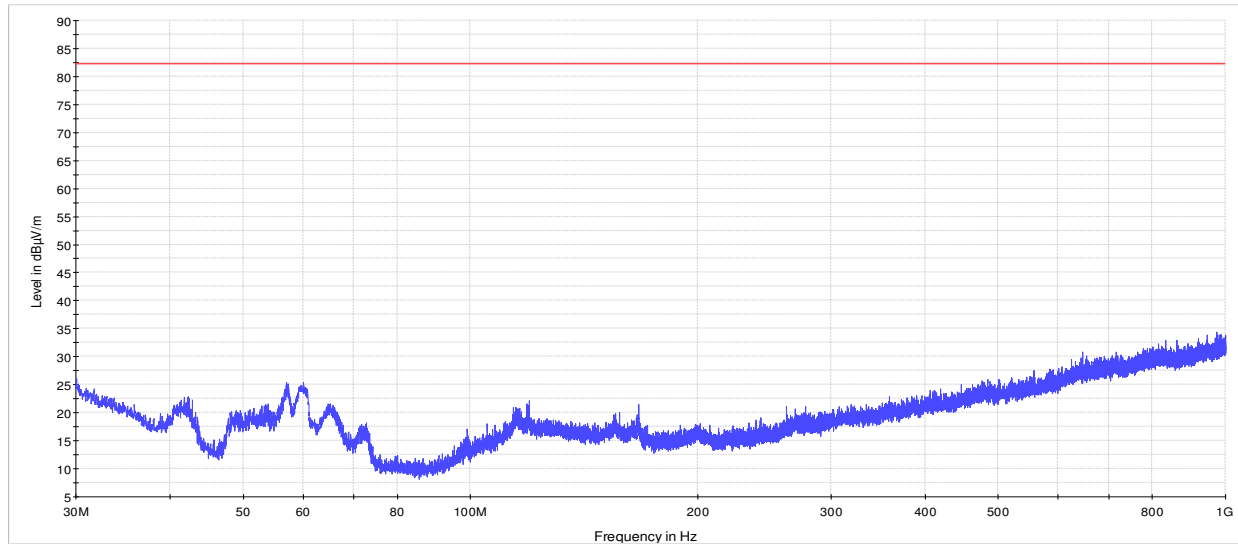
FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

Specification

FCC Part 24E and RSS-133

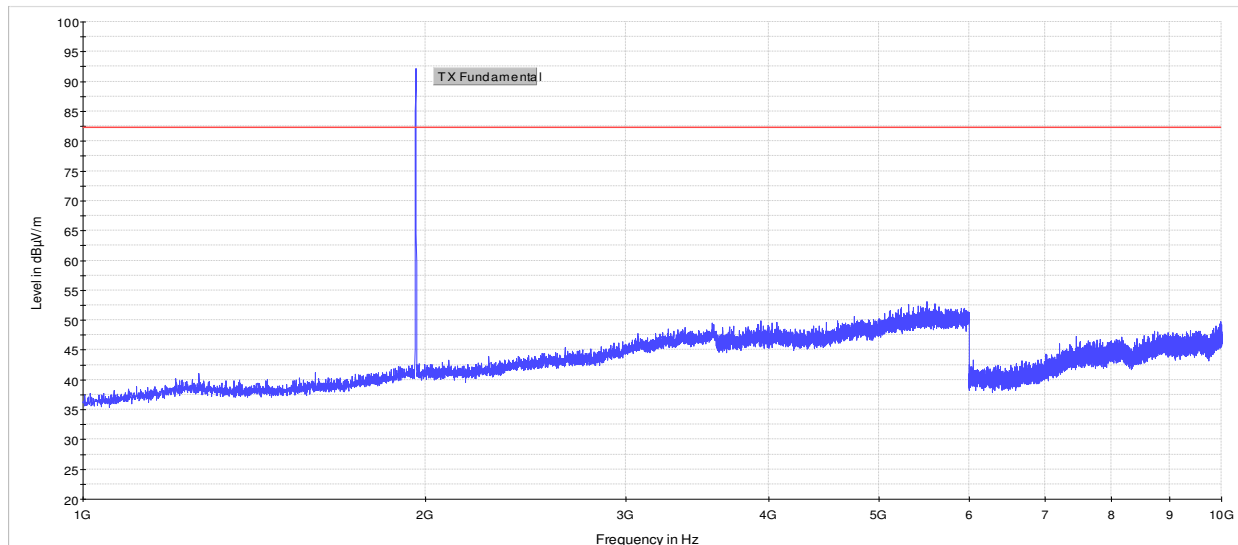


8.1.4 Test data, continued



Vertical and Horizontal (GSM_1Carrier_M_GSMK)
— MaxPeak-MaxHold-PK+
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-13: 30 to 1000 MHz – GSM_1Carrier_M_GSMK



Vertical and Horizontal (GSM_1Carrier_M_GSMK)
— Preview Peak Detector
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-14: 1 to 10 GHz – GSM_1Carrier_M_GSMK

Section 8

Testing data

Test name

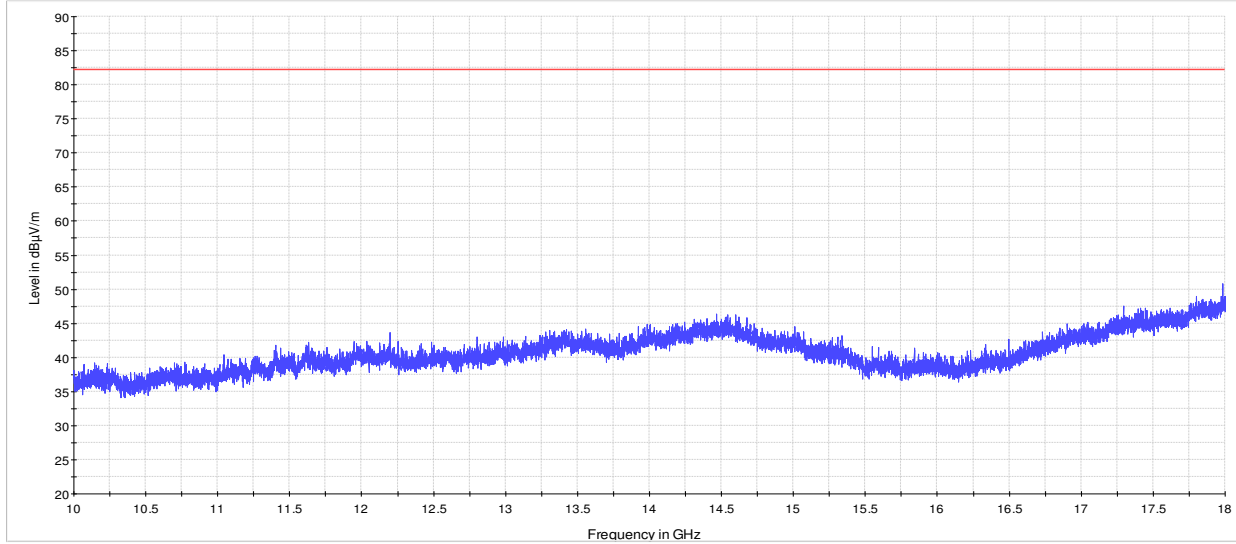
FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

Specification

FCC Part 24E and RSS-133

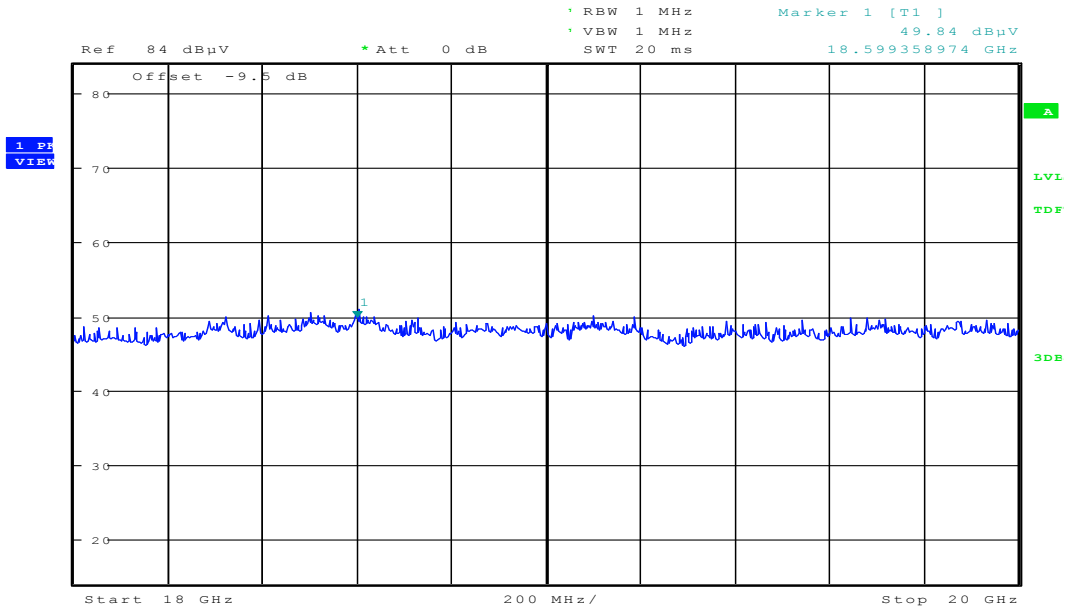


8.1.4 Test data, continued



Vertical and Horizontal (GSM_1Carrier_M_GSMK)
— Preview Peak Detector
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-15: 10 to 18 GHz – GSM_1Carrier_M_GSMK



Note: (Limit = 82.23 dBuV = -13 dBm)

Figure 8.1-16: 18 to 20 GHz – GSM_1Carrier_M_GSMK

Section 8

Testing data

Test name

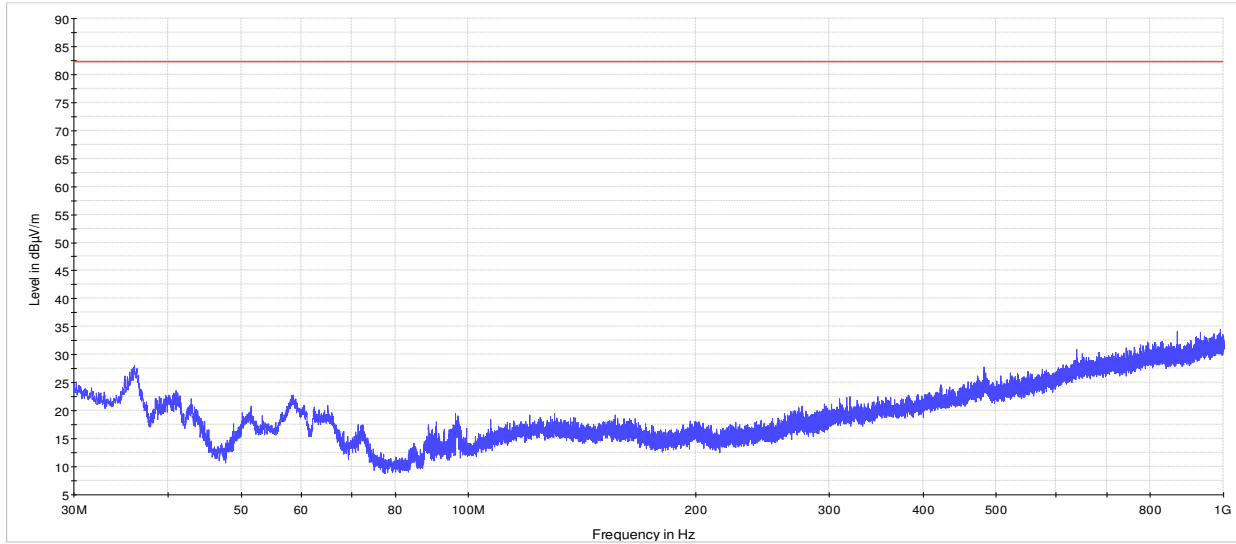
FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

Specification

FCC Part 24E and RSS-133

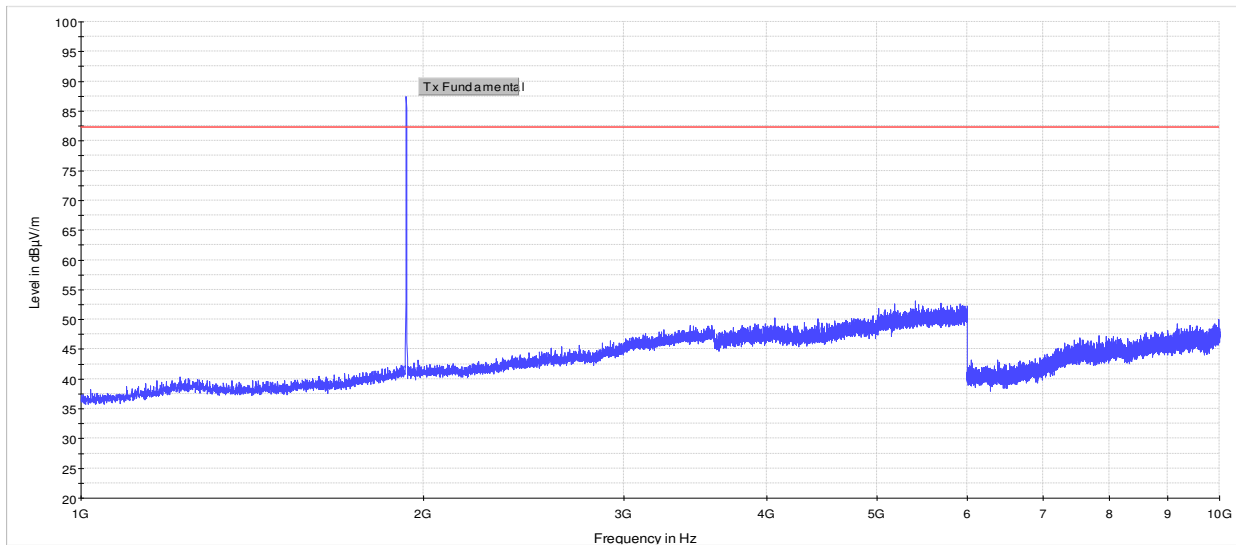


8.1.4 Test data, continued



Vertical and Horizontal (LTE_1Carrier_B_14M_QPSK)
— Preview Peak Detector
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-17: 30 to 1000 MHz – LTE_1Carrier_B_14M_QPSK



Vertical and Horizontal (LTE_1Carrier_B_14M_QPSK)
— Preview Peak Detector
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-18: 1 to 10 GHz – LTE_1Carrier_B_14M_QPSK

Section 8

Testing data

Test name

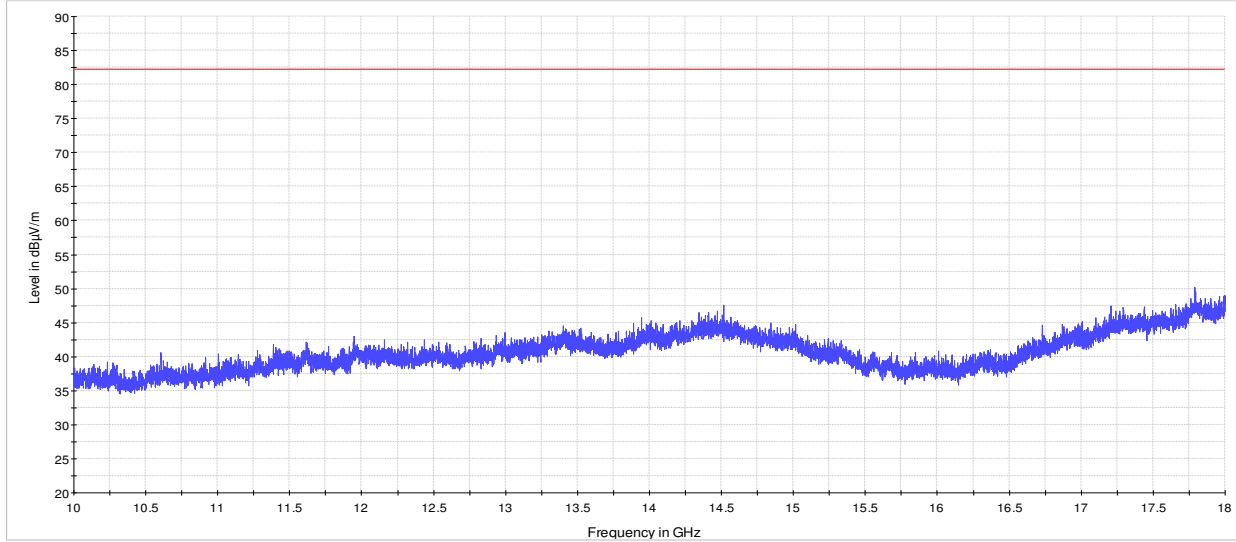
FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

Specification

FCC Part 24E and RSS-133

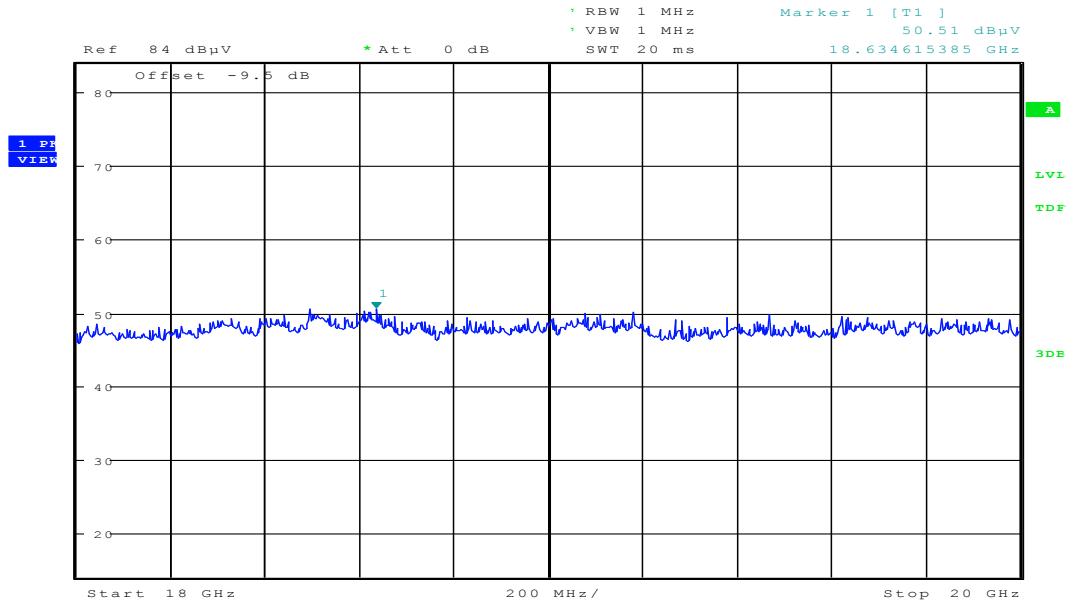


8.1.4 Test data, continued



Vertical and Horizontal (LTE_1Carrier_B_14M_QPSK)
 Preview Peak Detector
 Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-19: 10 to 18 GHz – LTE_1Carrier_B_14M_QPSK



Note: (Limit = 82.23 dBuV = -13 dBm)

Figure 8.1-20: 18 to 20 GHz – LTE_1Carrier_B_14M_QPSK

Section 8

Testing data

Test name

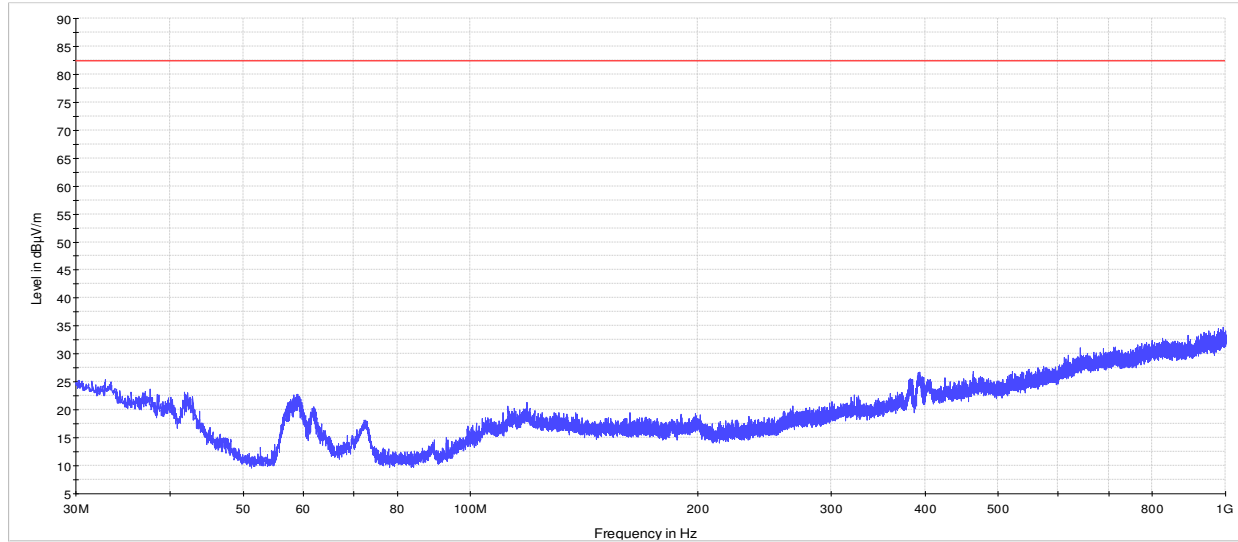
FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

Specification

FCC Part 24E and RSS-133

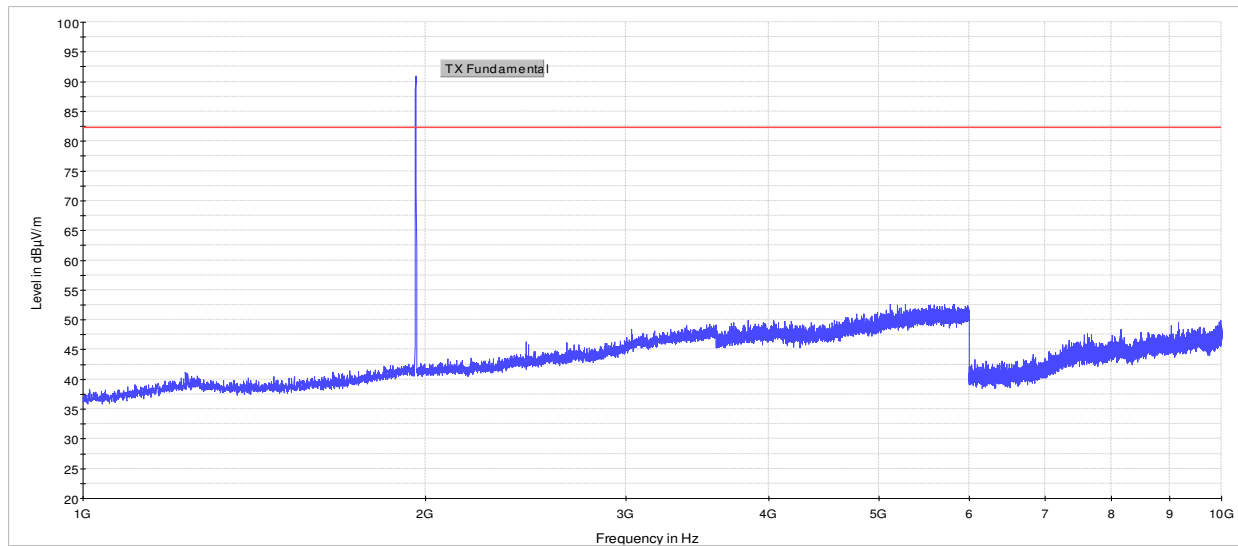


8.1.4 Test data, continued



Vertical and Horizontal (LTE_1Carrier_M_14M_QPSK)
— Preview Peak Detector
— Limit (82.23 dBµV/m = -13 dBm)

Figure 8.1-21: 30 to 1000 MHz – LTE_1Carrier_M_14M_QPSK



Vertical and Horizontal (LTE_1Carrier_M_14M_QPSK)
— Preview Peak Detector
— Limit (82.23 dBµV/m = -13 dBm)

Figure 8.1-22: 1 to 10 GHz – LTE_1Carrier_M_14M_QPSK

Section 8

Testing data

Test name

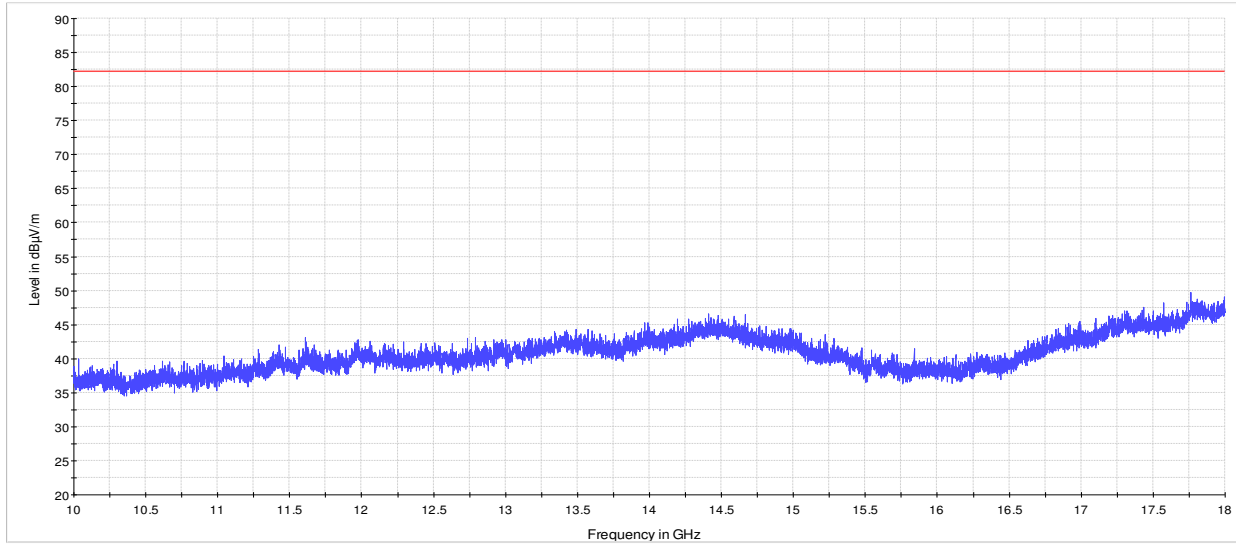
FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

Specification

FCC Part 24E and RSS-133

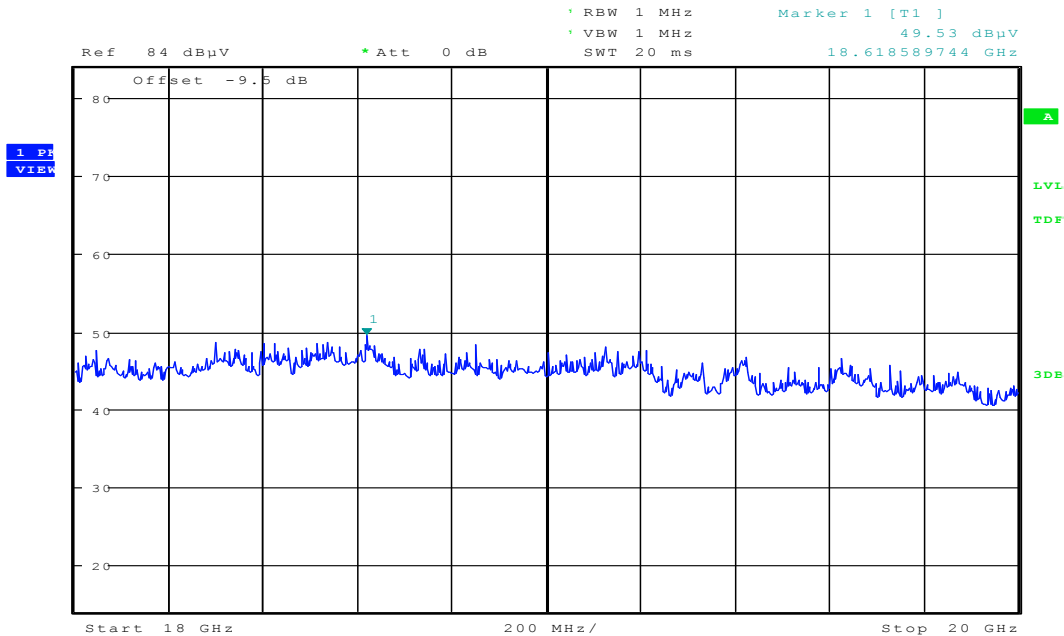


8.1.4 Test data, continued



Vertical and Horizontal (LTE_1Carrier_M_14M_QPSK)
 — Preview Peak Detector
 — Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-23: 10 to 18 GHz – LTE_1Carrier_M_14M_QPSK



Note: (Limit = 82.23 dBuV = -13 dBm)

Figure 8.1-24: 18 to 20 GHz – LTE_1Carrier_M_14M_QPSK

Section 8

Testing data

Test name

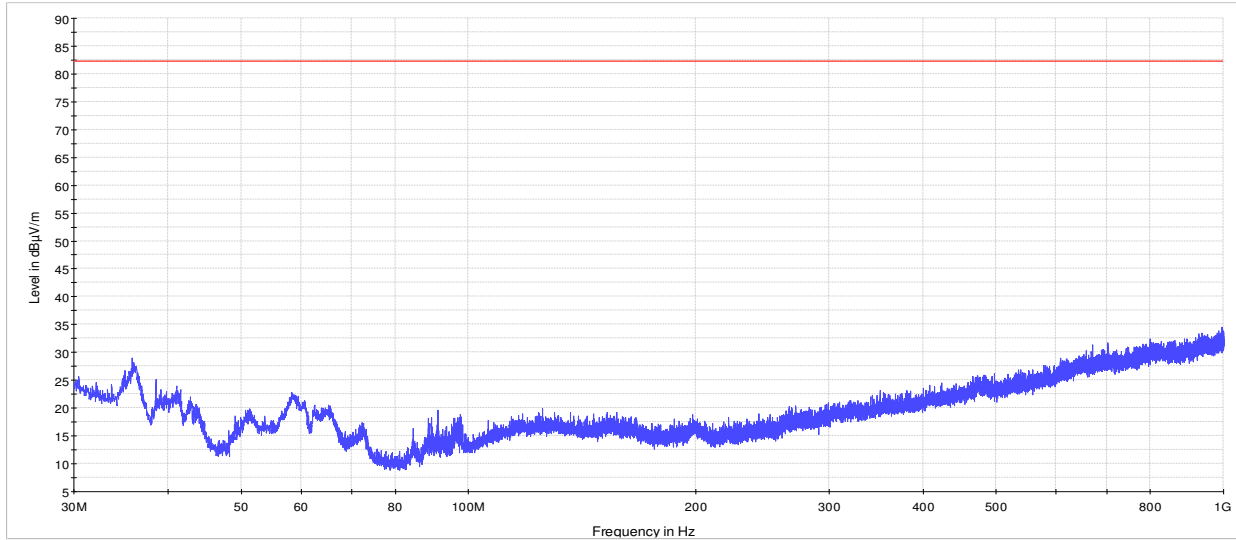
FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

Specification

FCC Part 24E and RSS-133

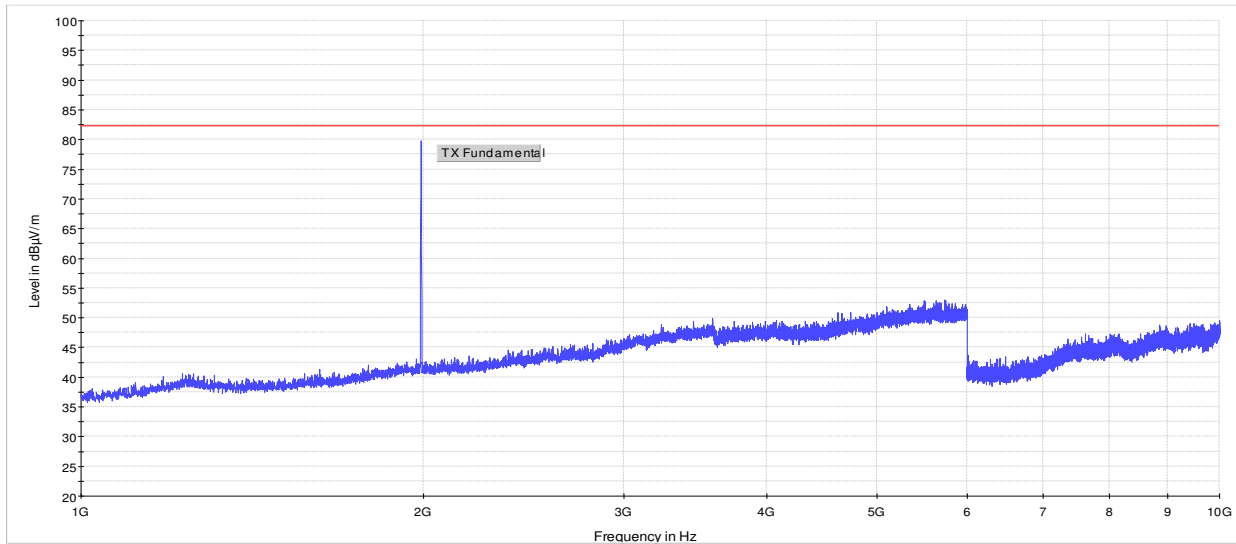


8.1.4 Test data, continued



Vertical and Horizontal (LTE_1Carrier_T_14M_QPSK)
— Preview Peak Detector
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-25: 30 to 1000 MHz – LTE_1Carrier_T_14M_QPSK



Vertical and Horizontal (LTE_1Carrier_T_14M_QPSK)
— Preview Peak Detector
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-26: 1 to 10 GHz – LTE_1Carrier_T_14M_QPSK

Section 8

Testing data

Test name

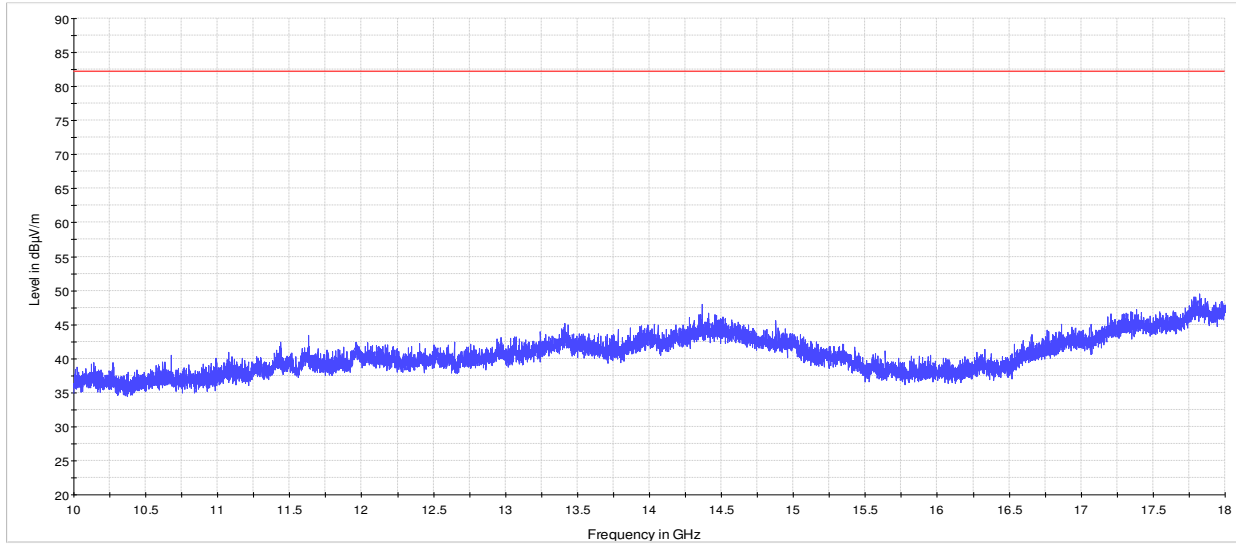
FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

Specification

FCC Part 24E and RSS-133

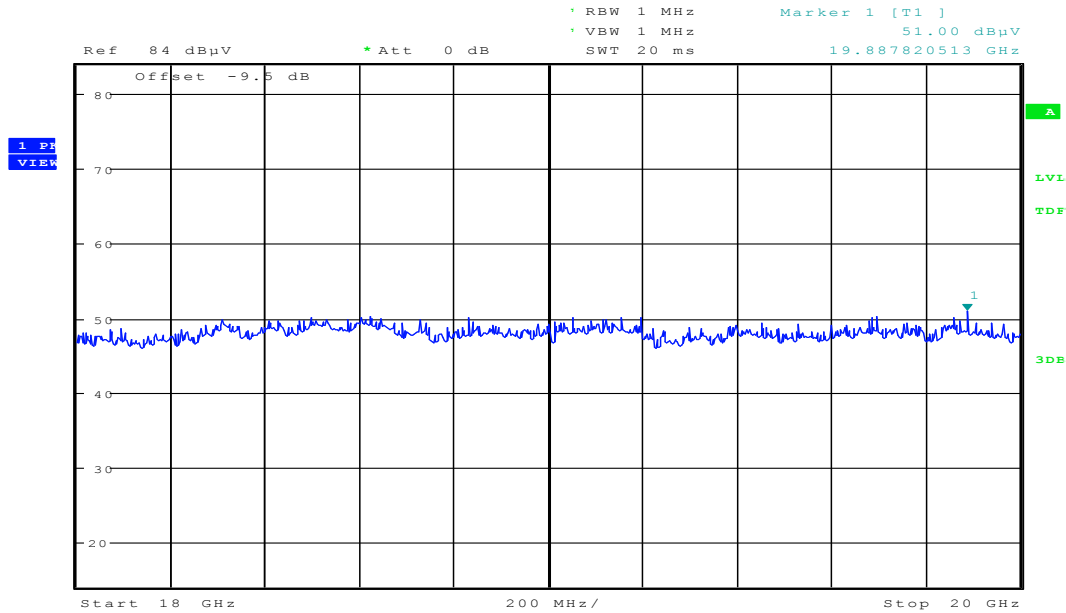


8.1.4 Test data, continued



Vertical and Horizontal (LTE_1Carrier_T_14M_QPSK)
— Preview Peak Detector
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-27: 10 to 18 GHz – LTE_1Carrier_T_14M_QPSK



Note: (Limit = 82.23 dBuV = -13 dBm)

Figure 8.1-28: 18 to 20 GHz – LTE_1Carrier_T_14M_QPSK

Section 8

Testing data

Test name

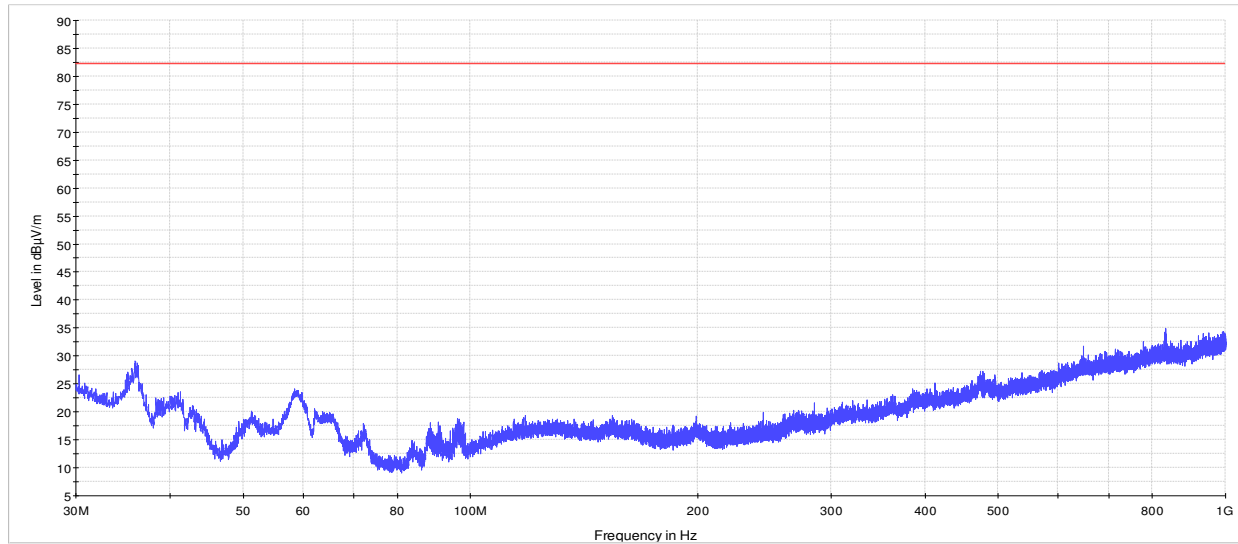
FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

Specification

FCC Part 24E and RSS-133

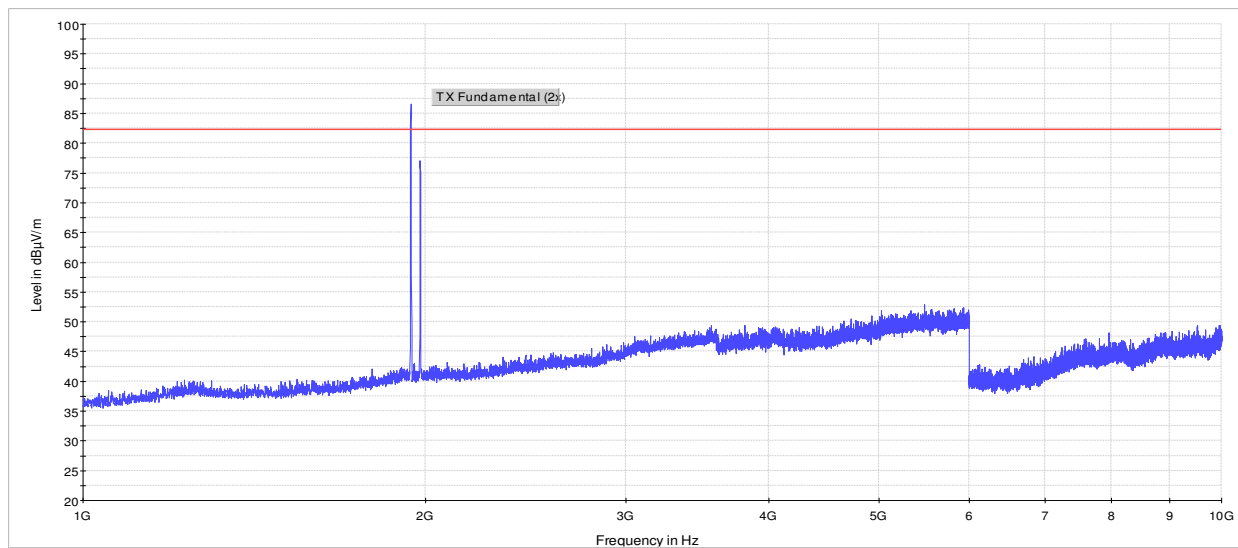


8.1.4 Test data, continued



Vertical and Horizontal (LTE_2Carrier_M_14M_QPSK)
— Preview Peak Detector
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-29: 30 to 1000 MHz – LTE_2Carrier_M_14M_QPSK



Vertical and Horizontal (LTE_2Carrier_M_14M_QPSK)
— Preview Peak Detector
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-30: 1 to 10 GHz – LTE_2Carrier_M_14M_QPSK

Section 8

Testing data

Test name

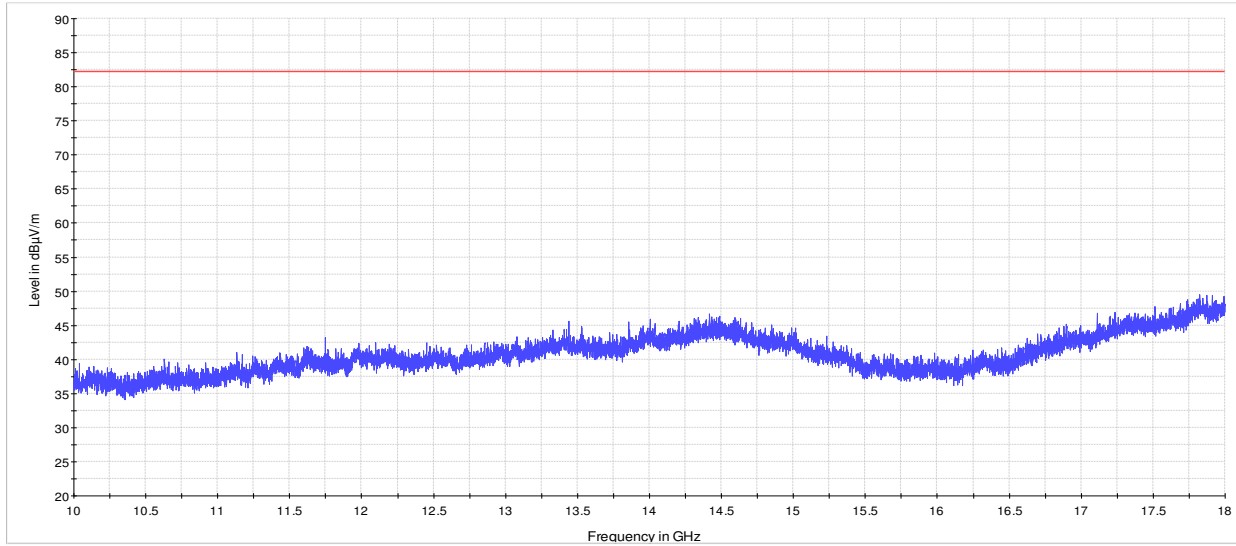
FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

Specification

FCC Part 24E and RSS-133

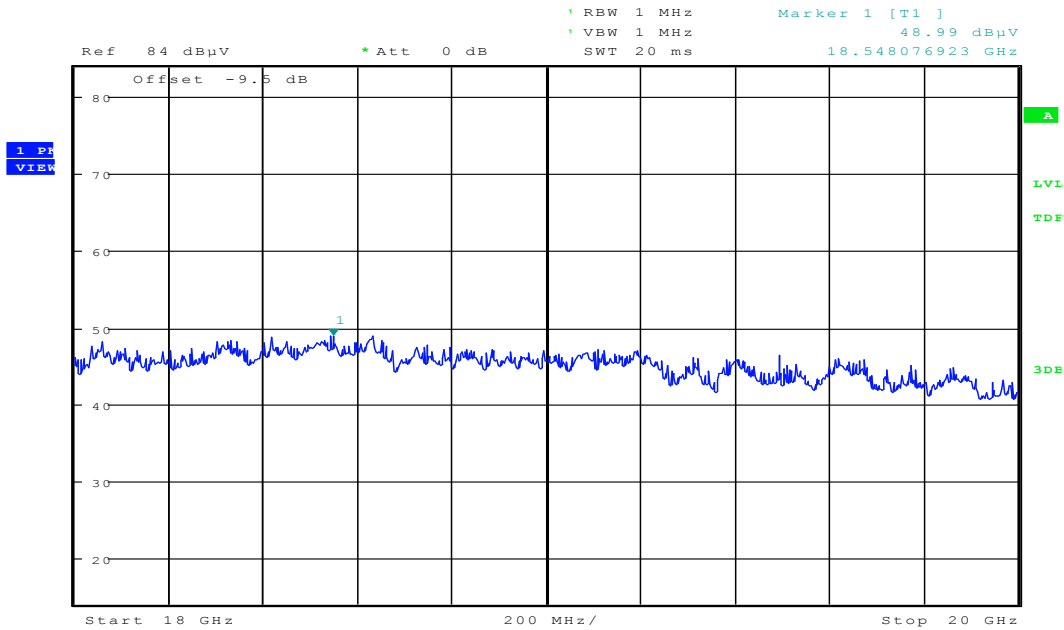


8.1.4 Test data, continued



Vertical and Horizontal (LTE_2Carrier_M_14M_QPSK)
 Preview Peak Detector
 Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-31: 10 to 18 GHz – LTE_2Carrier_M_14M_QPSK



Note: (Limit = 82.23 dBuV= -13 dBm)

Figure 8.1-32: 18 to 20 GHz – LTE_2Carrier_M_14M_QPSK

Section 8

Testing data

Test name

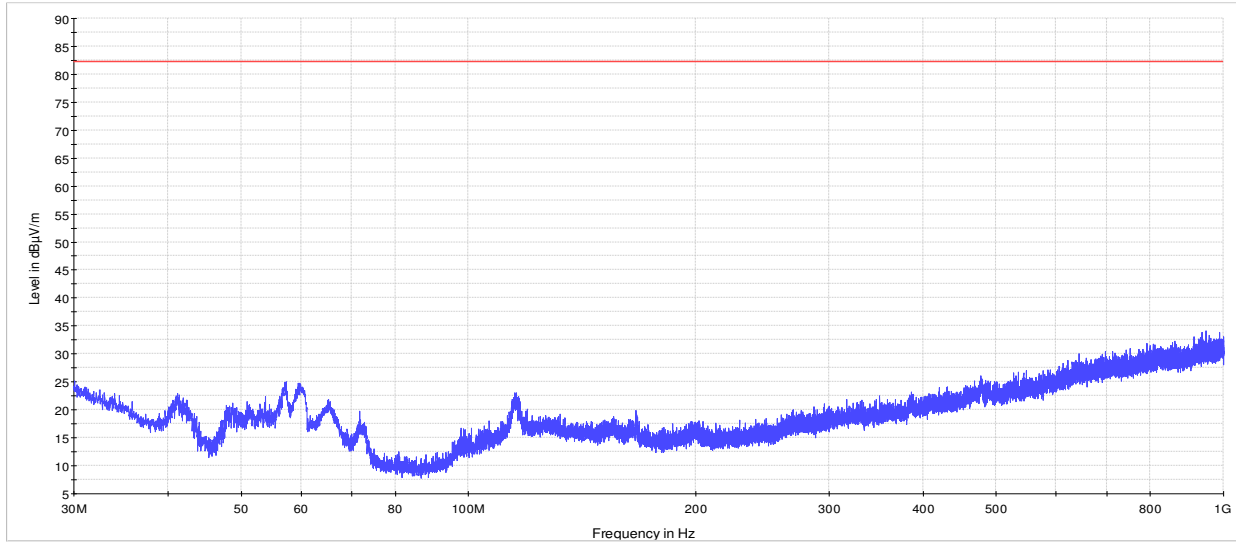
FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

Specification

FCC Part 24E and RSS-133

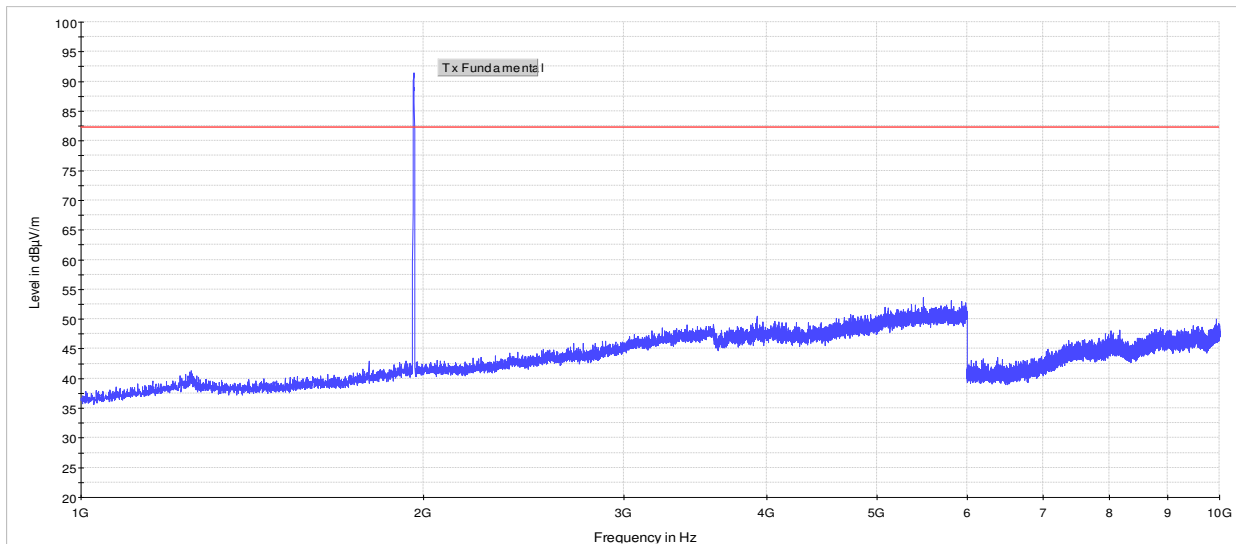


8.1.4 Test data, continued



Vertical and Horizontal (WCDMA_1Carrier_M_16QAM)
— MaxPeak-MaxHold-PK+
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-33: 30 to 1000 MHz – WCDMA_1Carrier_M_16QAM



Vertical and Horizontal (WCDMA_1Carrier_M_16QAM)
— Preview Peak Detector
— Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-34: 1 to 10 GHz – WCDMA_1Carrier_M_16QAM

Section 8

Testing data

Test name

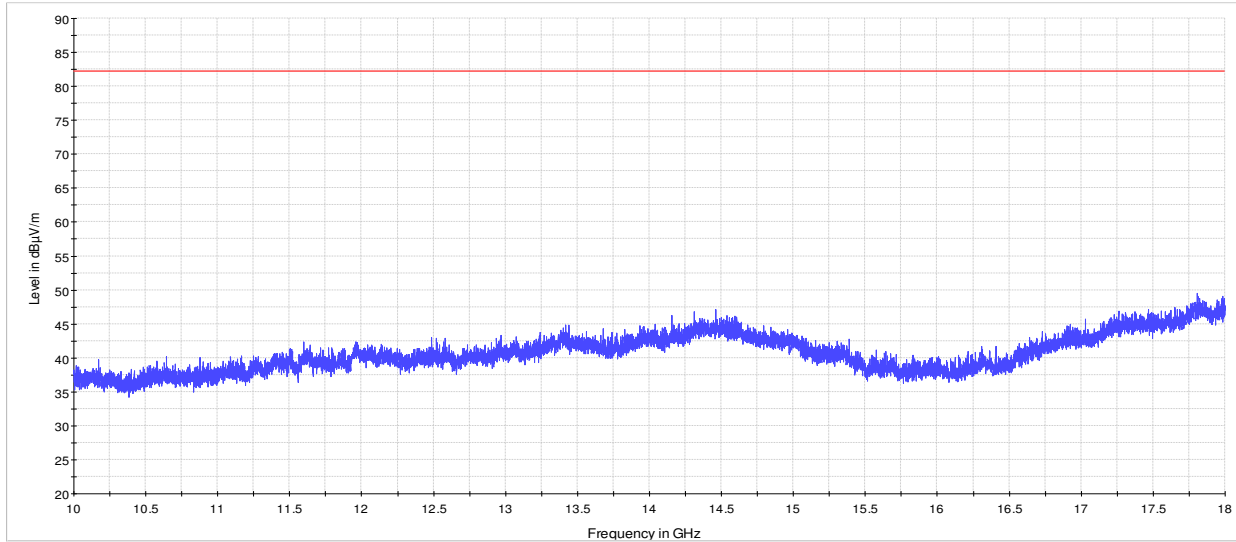
FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

Specification

FCC Part 24E and RSS-133

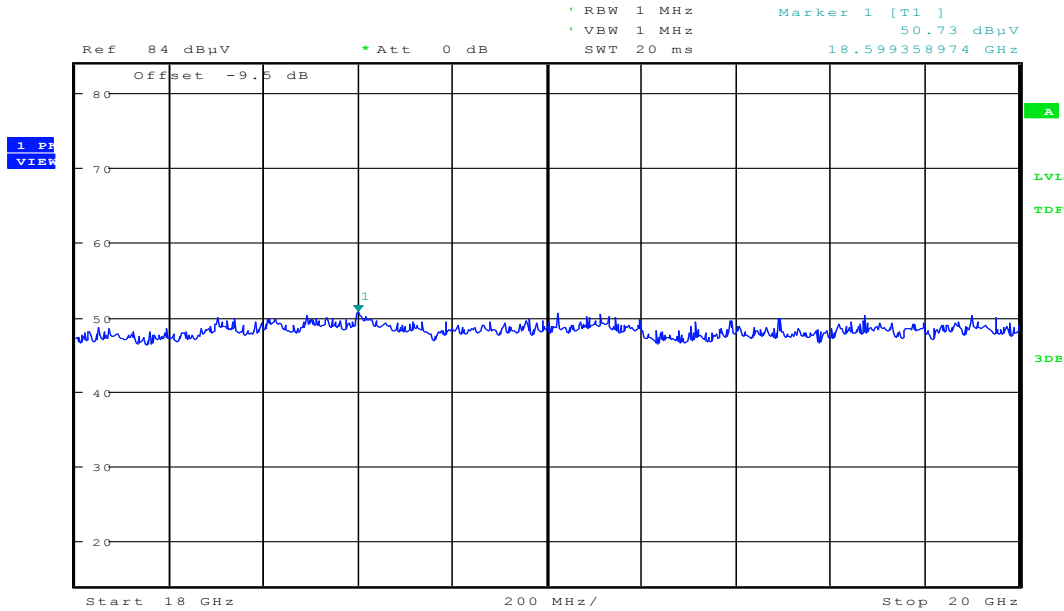


8.1.4 Test data, continued



Vertical and Horizontal (WCDMA_1Carrier_M_16QAM)
 Preview Peak Detector
 Limit (82.23 dBuV/m = -13 dBm)

Figure 8.1-35: 10 to 18 GHz – WCDMA_1Carrier_M_16QAM



Note: (Limit = 82.23 dBuV= -13 dBm)

Figure 8.1-36: 18 to 20 GHz – WCDMA_1Carrier_M_16QAM

Section 8

Testing data

Test name

FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

Specification

FCC Part 24E and RSS-133



8.1.5 Setup photos



Figure 8.1-37: Setup photo – 30 to 1000 MHz



Figure 8.1-38: Setup photo – 30 to 1000 MHz

Section 8

Testing data

Test name

FCC Part 24 Clause 24.238(a) Out of band emissions and RSS-133 Clause 6.5.1 (ii) Transmitter Unwanted Emissions (Radiated)

Specification

FCC Part 24E and RSS-133



8.1.5 Setup photos, continued

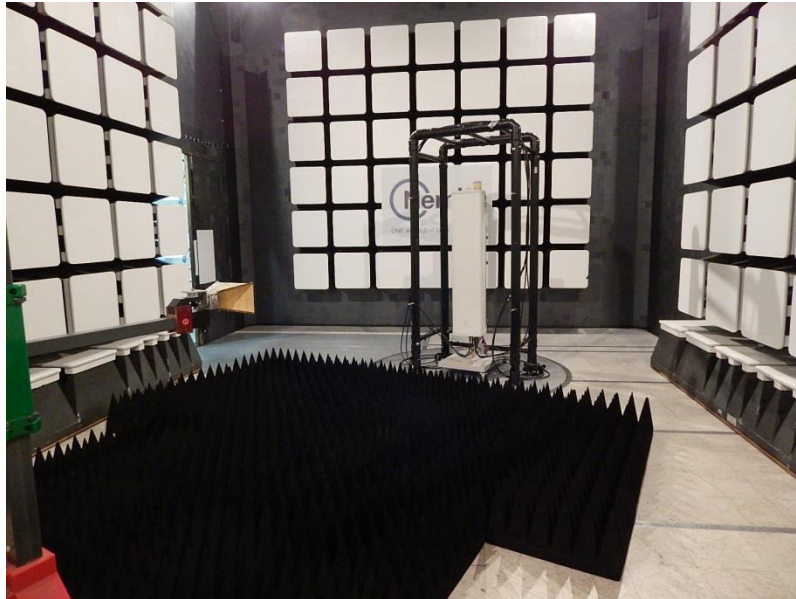


Figure 8.1-39: Setup photo – above 1 GHz

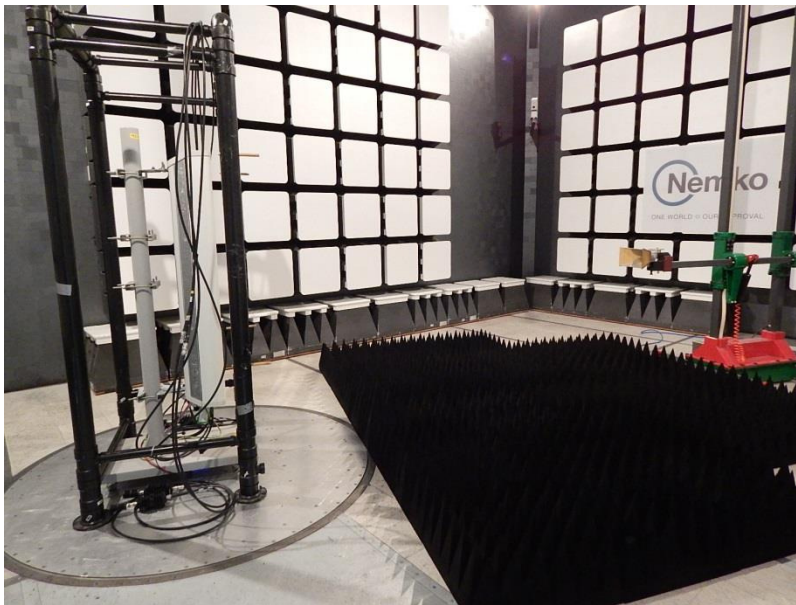
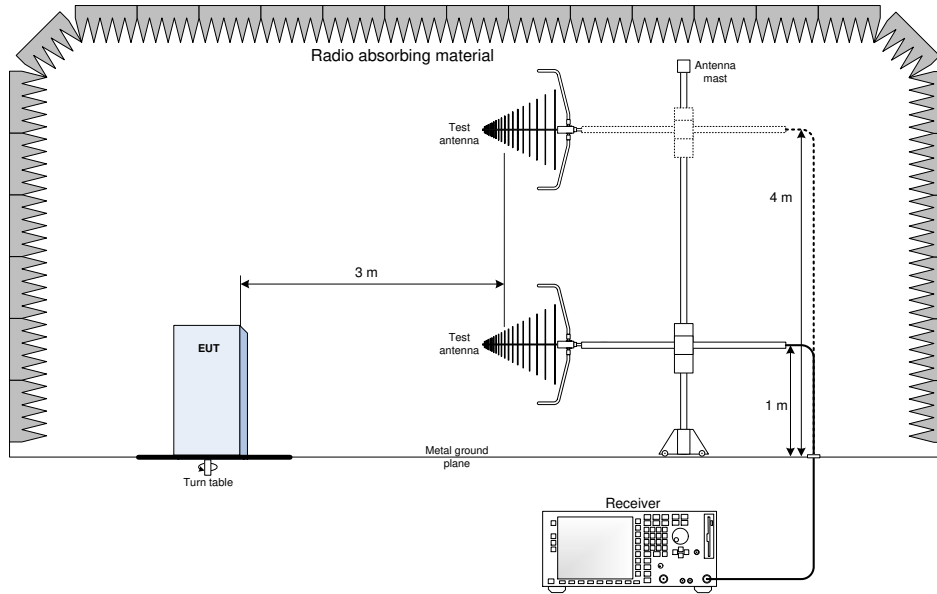


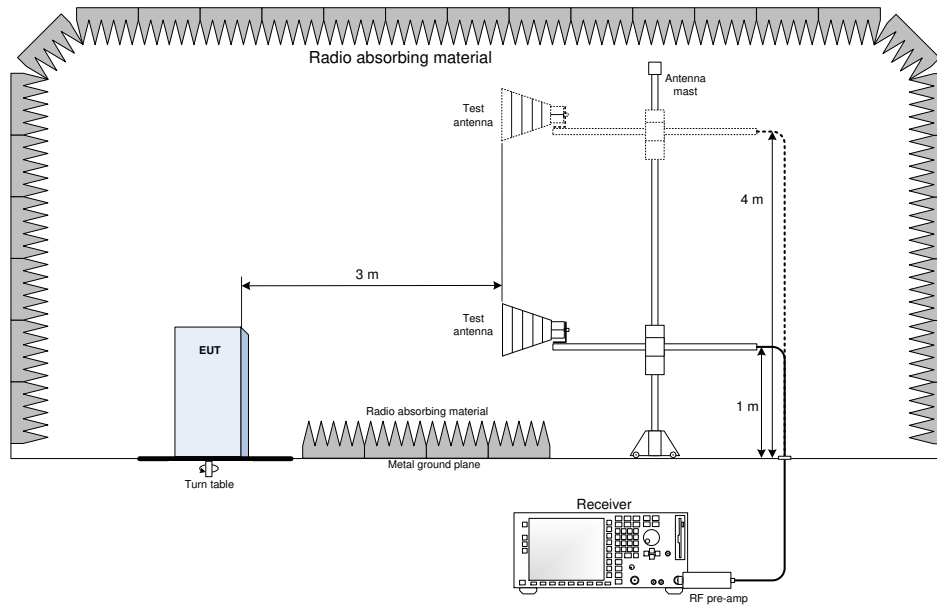
Figure 8.1-40: Setup photo – above 1 GHz

Section 9. Block diagrams of test set-ups

9.1 Radiated emissions set-up 30 to 1000 MHz



9.2 Radiated emissions set-up above 1 GHz



Section 10. EUT photos

10.1 External photos



Figure 10.1-1: Front views



Figure 10.1-2: Rear views

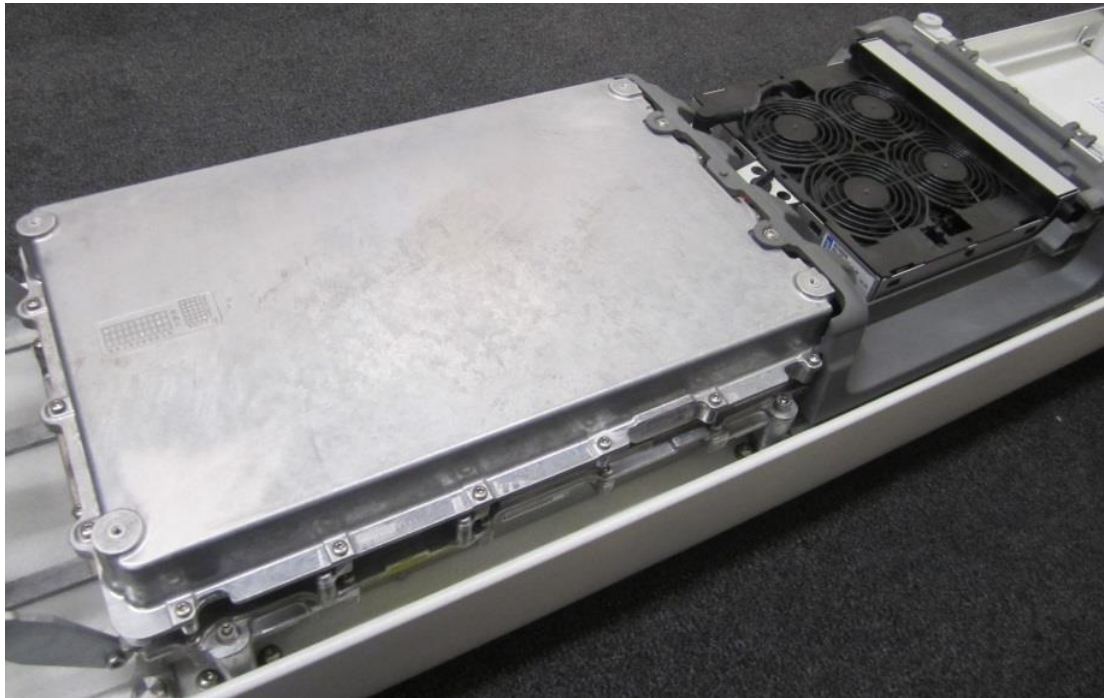


Figure 10.1-3: RRUS 32A B2 with Fan Tray